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LIVING SUTURES IN THE TREATMENT OF HERNIA*

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INTEREST in the subject of hernia has recently been aroused by the extraordinary number of recurrences which have developed after operations performed on soldiers during the war. It is impossible to estimate accurately the percentage of these recurrences, owing to the difficulty of obtaining the army records, but, from our own experience, we know that it is high. In all the army hospitals in this country large numbers of men have been operated upon a second and sometimes a third time for what were originally simple hernias. It has been suggested that the majority of these recurrences have resulted either from lack of skill among the operators or from defective after-treatment. This is an explanation which we have been unable to accept. Practically all the recurred hernias that have been referred to us for repair were operated upon originally by surgeons of recognized ability and the records have shown that these patients were accorded the best of after-care. Our conclusions have been that the failures are due in large degree to the ineffectiveness of the types of operations performed and that faith in the accepted principles of treatment is not warranted by the results.

A study of the recurred hernias which came under our observation simply showed that in most instances the muscular and aponeurotic structures which had been sewn together in an attempt to close the abdominal defect had not remained firmly healed together but had separated sufficiently to allow the protrusion of another sac. In the hope that we might find a means of pre-

venting this misfortune we undertook a clinical and experimental study of the principles underlying the various types of operations and we are now in a position to make a report on our investigations and to point out a method by which the defect in these principles may be overcome.

The operations for hernia may be grouped into four general classes: those in which muscles and aponeuroses are drawn together or overlapped over the defect in the abdominal wall by sutures of absorbable material; those in which non-absorbable sutures are employed; those in which pedunculated flaps of muscle or fascia, or free transplants of fascia, are sutured into or over the defect with absorbable or non-absorbable sutures; and those in which foreign materials, such as filigrees of silver wire, are used to support the weak spot in the wall. The latter method has been practically abandoned owing to the frequency with which the wounds suppurate and to the tendency of the foreign material to set up late irritation which can only be relieved by its removal, so that further investigation of this method is unnecessary. The other methods are in common use, however, and to these our attention has been directed.

In the preliminary experiments the simple healing of wounds in fascia and aponeurosis was investigated. Longitudinal and transverse incisions were made in these structures in the backs of rabbits and closed with catgut sutures. The specimens were recovered at varying intervals up to several months. Immediately following the operation there was an acute inflammatory reaction in the area with the formation of a film

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of new connective tissue over the line of the incision and in the space between the edges of the wound. (Fig. 1). This film consisted at first of an ordinary granulation tissue composed of proliferating cells and blood-capillaries. After a week the cells and blood-vessels began to disappear and their place was taken by irregularly arranged connective tissue fibres. This new tissue was continuous with the areolar membranes which are normally on the surface of the fascia and aponeurosis, and, after the lapse of a few weeks, had become practically indistinguishable from them. In no case did we observe any evidence of inflammatory reaction in the cells of the fascia or aponeurosis themselves, nor did we see anything to indicate that these tissues contributed to the production of the new tissue in the line of the scar. In none of the specimens did this newly formed scar tissue resemble adult fibrous tissue in the parallel arrangement of fibres. It was characterized, on the contrary, by irregularity of the fibres, and as time went on it grew more and more to resemble the areolar membranes which clothe these structures. (Fig. 2). From a histological point of view, therefore, the bond of union between the cut edges of the fascia and aponeurosis appeared to be decidedly weaker than these tissues themselves and it seemed likely that the line of union would always constitute a weak spot when the area was subjected to strain. This conclusion was amply supported by the naked eye appearances of the specimens examined after the lapse of weeks and months, for it was almost invariably found that in those specimens in which the edges of the wound had been sutured under tension, or in which the line of sutures was subsequently subjected to strain, separation had resulted owing to the stretching of the scar.

In a second series of experiments the catgut used to approximate the edges of the wound was replaced by silk and linen. In the specimens recovered after these operations the tendency of the sutured edges to separate was less marked than when absorbable sutures were employed. In some cases the sutures remained permanently in position surrounded and supported by dense scar tissue. In others, although the sutures had cut out, the amount of scar tissue in the line of suture was so abundant and dense that it appeared to be quite strong enough to prevent any tendency of the edges of the wound to separate. In many, however, the separation had occurred

as when catgut was used and the sutures were found to have cut out from one side or the other and the scar to have stretched.

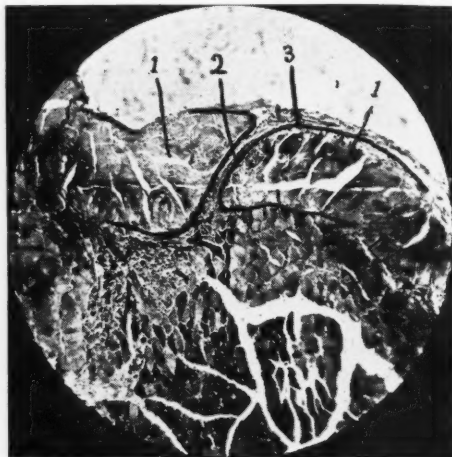


Fig. 1

Healing of incision in aponeurosis, three weeks after suture. (1) Aponeurosis on either side of incision. (2) New tissue filling in the space between the edges of the wound. This new tissue is apparently derived from the normal areolar covering of the aponeurosis. (3) It will be noted that the aponeurosis itself seems to take no part in the process of repair.



Fig. 2

Healing of incision in aponeurosis, thirteen months after suture. (1) and (2) Aponeurosis on either side of incision. (3) New tissue uniting edges of wound. This new tissue shows the irregular arrangement of fibres, and slight stretching under strain.

Herein lies the explanation, therefore, of many of the failures which have attended attempts to close simple inguinal hernias, and particularly direct inguinal hernias and the large hernias which develop in the line of incision of former abdominal operations or in the region of the umbilicus. In these cases the surgeons have depended for closure of the defect in the abdominal wall upon simple suture of the aponeurotic structures which constituted the hernial ring, and have not appreciated the fact that the scar which forms is unequal to the strain to which the abdominal wall is normally subjected. The experiments demonstrate the risk also which invariably attends abdominal operations in which incisions are made in the middle line or in the linea semilunaris. In such patients every increase in intra-abdominal pressure and every strong contraction of the muscles of the abdominal wall tend to draw the edges of the former incision apart, with the result that post-operative hernia after such incisions is exceedingly frequent.

In order that we might investigate more closely the process of healing after the simplest operations for hernia, as, for example, the operation for the cure of oblique inguinal hernia, a series of experiments was performed in which the various steps of the operation were imitated as closely as possible. In the operation for inguinal hernia, after removal of the sac, the internal oblique muscle and the conjoint tendon are sutured to the reflected portion of Poupart's ligament by catgut or some form of non-absorbable material. In animals, however, the inguinal canal is so different from that of the human being, in that it naturally tends to close with every contraction of the abdominal muscles, and, owing to the arrangement of the animal's body and limbs, is protected from effects of increased intra-abdominal pressure, that we performed our experiments on the animal's back where something more comparable with the conditions in the human inguinal region could be obtained. In one group of experiments the fascia of the back was exposed and two folds of the fascia picked up with forceps and sutured together with catgut. In another group the fascia was raised from the underlying muscle and then sutured to it for a distance of an inch or more. In a third group of experiments two neighbouring parallel muscles were simply sewn together for a similar distance. When the specimens were recovered some weeks later there was no evidence whatever that any operation had been per-

formed. The plicated fascia had simply flattened out into its former position after the absorption of the sutures and the suture line between the aponeurosis and muscles and between muscle and muscle has completely disappeared.

That this sequence of events occurs not infrequently after operations for inguinal hernia is well known, for many operators have reported that at a second operation for the repair of a hernia they have observed that the internal oblique, which had previously been sewn down to Poupart's ligament, had returned to its normal position and there was nothing to show that its normal relations had ever been disturbed. Over and over again we have made this same observation in patients upon whom we have operated for recurred hernia, particularly in regard to the suture of the conjoint tendon to the ligament. It would seem, therefore, that the simple suture of the muscle or tendon to Poupart's ligament adds little, in many cases, to the probability of a cure.

That this wide separation of the sutured structures does not always occur is equally true, however, and is readily explained by a simple modification of the experiments. If, before suturing muscle to muscle, or fascia to muscle, or fascia to fascia, the structures be thoroughly cleared of all areolar tissue, or preferably if they be deliberately scarified, varying degrees of adhesion will certainly take place. This is particularly true of the muscles and it is readily explained if one considers the structure of muscle. Muscle is composed of bundles of parallel fibres separated by a stroma of fibrous connective tissue which is continuous with the sheath which clothes the surfaces. When a muscle is injured the repair is accomplished practically altogether by the connective tissue of the stroma, so that when wounded muscles are sutured, or scarified muscle surfaces held in contact, solid union occurs owing to the healing together of the divided connective tissue stroma. This stroma has such an intimate connection with the depths of the muscle that when healing is completed the line of union is very strong and is able to withstand any ordinary degree of strain. To a certain extent this is true also of fascia, aponeurosis and tendon, for these structures are likewise formed of bundles of parallel fibres which are enclosed in a sheath and stroma of less regularly arranged connective tissue. The stroma in these structures is so scanty, however, when compared with muscles,

and the area of the injured surfaces which are placed in contact is so small, when they are sutured together in edge to edge apposition, that the bond of union is very delicate and the connection of the scar with the stroma of the interior is slight. In order, therefore, that fascial or aponeurotic structures may be induced to heal together with sufficient strength to withstand the strain to which these structures are normally subjected, some means must be discovered of increasing the amount of scar tissue forming in the line of union and of increasing the intimacy with which it is connected with the depths of the tissue. This may be done by thorough scarification of the fascia or aponeurosis before it is sutured, and by freely overlapping the edges. This principle has been well recognized in operations for the cure of ventral hernia, but is almost universally neglected in the operations on the inguinal canal, and it undoubtedly accounts for many of the unsuccessful results in direct hernia, where closure of the defect in the abdominal wall is the all-important feature of the operation.

But while our experiments demonstrated that scarifying and overlapping the edges of divided fasciae and aponeuroses did increase the probability of permanent union, yet even these precautions were insufficient when the line of union was subjected to unusual strain. Frequently the edges drew apart leaving a defect which was filled with very feeble areolar or scar tissue. Thus is explained the high percentage of recurrences after operation for large ventral hernias, particularly in patients with wide hernial rings and with large amounts of intra-abdominal fat. The experiments also demonstrate the folly of subjecting such patients to the doubtful chance of a cure when the edges of the defect in the abdominal wall can only be dragged together or overlapped by means of Kocher clamps and can only be held in position by heavy kangaroo tendon sutures. Such operations surely invite disaster.

The search for a method by which the number of failures attending such operations might be reduced led to the idea of filling the defects in the abdominal wall with pedunculated transplants of aponeurosis or free transplants of fascia lata. It had been demonstrated that such transplants, when placed in such a position that they received an adequate supply of lymph, continued to live unchanged, and it appeared reasonable to suppose that the principle might be used to advantage in

cases of hernia in which the edges of the ring could not be drawn together, or in which they could only be brought together under great tension. In this way was developed the operation for direct inguinal hernia in which a pedunculated flap was turned down from the sheath of the rectus and sutured to Poupart's ligament in such a way as to fill up the triangular space between the edge of the rectus and the ligament. The free fascial transplants were used to close the abdominal defects in large ventral hernias or to support the line of suture when the edges of the ring had been drawn together. It soon became apparent, however, that the method was by no means certain to accomplish a cure, for patients still continued to present themselves in whom the hernia had recurred. So little did the principle improve the percentage of cures, and so great was the added difficulty of the operation, that the method was very soon abandoned and is now practically never employed.

Our investigation has shown quite clearly the reason for these disappointing results. In a series of experiments we removed patches of fascia and aponeurosis from the backs of various animals and immediately fastened them back into their original position with sutures of various kinds. As indicated in our previous paper,* these transplants continued to live practically unchanged. During the first two weeks a mild inflammatory reaction developed, as evidenced at first by cedema of the transplant and of the neighbouring tissues, and later by proliferation of the blood-vessels and connective tissue cells of the film of areolar tissue which lies on the surface of the fascia. The tendon cells and fibres of the transplant appeared to take no part in the process. As time went on the inflammatory reaction subsided, leaving the transplant exactly as it was before the operation and held in position by delicate scar tissue derived from the areolar fibres of the neighbourhood. If the investigation had gone no further, it would have seemed that the principle thus demonstrated would solve completely the problem of closing hernial defects. We soon found, however, that this satisfactory healing-in of the transplant only took place when the line of suture was subjected to no strain. Whenever it was found that the suture of the transplant to the edge of the defect could be accomplished only with considerable tension on

*The Use of Living Sutures in Operative Surgery. *Canadian Medical Association Journal*, July, 1921.

the suture material, or when it could be seen that the normal activities of the animal would produce strain on the line of healing, it was invariably found that after a few weeks the edges of the transplant and the defect had separated exactly as occurred in the simple incised wounds in fascia described above. The separation was due to the stretching of the scar in the line of union. As in the case of incised wounds, we also tried overlapping the edges of the transplants and the surrounding fascia. This undoubtedly reduced the tendency of the edges to separate, particularly if the opposed surfaces were thoroughly denuded of areolar tissue and scarified, but even when these precautions were taken, separation frequently took place, leaving a defect which was filled only with thinned out scar tissue. (Fig. 3). These experiments demonstrate very clearly, therefore, the reason for the frequent failures which attend the ordinary operations for closure of hernial defects, and they show conclusively

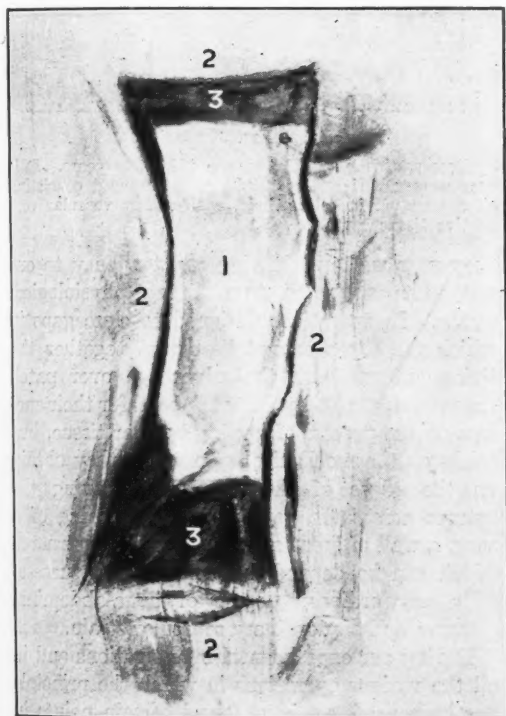


FIG. 3

"Patch" transplant of aponeurosis after thirteen months. (1) Aponeurotic transplant. (2) Normal aponeurosis forming edges of gap. (3) Thin film of new tissue uniting the two. At the operation, the transplant was accurately sutured all around its edge to the normal aponeurosis. Union has taken place by the formation of scar tissue, which has stretched considerably.

that before we can approach these conditions with any certainty of success we must be able to provide some means of holding the edges of the hernial ring together which is stronger than the scar tissue which develops in the ordinary process of repair.

It was during a search for some method by which we might overcome this difficulty that the idea of using living sutures occurred to us. The experiments by which the method was developed have already been outlined in our previous paper, but a brief review of the subject will be of value in applying the principle involved to the treatment of hernia. In these experiments we removed long strips of fascia, a quarter of an inch wide, from the rabbits' backs, and, threading them into large-eyed needles used them as sutures to prevent the edges of the gap in the fascia from spreading. The edges of the gap were left approximately a half an inch apart, in order that the whole strain might come on the suture without assistance from scar tissue. The specimens have been recovered at intervals of weeks up to two years. By this means we have been able to demonstrate that sutures obtained in this way behave like ordinary fascial grafts. (Fig. 4). They continue to live practically unchanged. As a result of following the needle through a tight needle hole, they become folded into rounded cords, and, in the course of two to three weeks, become surrounded with a vascular



FIG. 4

Gross appearance of fascial suture two years after its insertion. It is now a rounded, glistening cord, closely resembling tendon.

areolar film which sends septa of similar tissue into the depths of the cord in the spaces left between the folds. A cross section of the suture at this time and later has the appearance of a normal tendon. (Fig. 5 & 6). By testing in a special

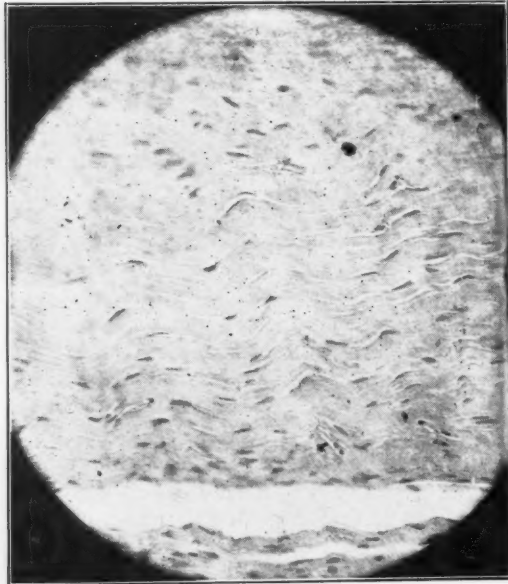


FIG. 5

Longitudinal section of fascial suture, showing persistence of regular, parallel arrangement of fibres.

machine the tensile strength of sutures at the time of the operation and again at the time of the autopsy we were able to demonstrate fairly accurately that no appreciable change takes place after the transplantation. Further, by fastening black silk markers on the living suture at accurately measured intervals, we found that no stretching or contraction occurs which could interfere with the success of an operation. It seems conclusively demonstrated, therefore, that in strips of fascia lata we have a suture material which is ideal for use in operations in which it is desired to hold together structures, such as the edges of hernial rings, which naturally tend to separate. It remains only for the surgeon to employ a technique which ensures that the suture is solidly anchored into unyielding tissue, such as healthy muscle and aponeurosis, and to make sure that a sufficient quantity of the suture is employed to withstand the anticipated strain and to completely fill the gap where the edges cannot actually be drawn together. From our experimental evidence, the advantages of the living sutures are briefly these: Over catgut and simi-

lar sutures they have the great advantage that they are not absorbed and that they continue for all time to perform the function for which they were originally intended. Over silk and other non-absorbable materials they have the advantage that they are composed of living tissue which is perfectly non-irritant, and that they heal solidly into the structures through which

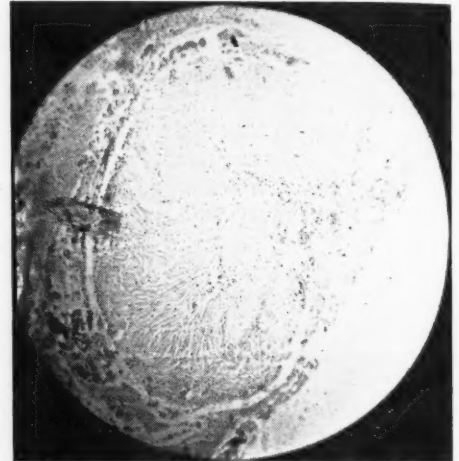


FIG. 6

Cross section of fascial suture after two years. It is now a rounded cord resembling tendon, and consisting of a mass of parallel fibres, with a few vascular connective tissue septa.

they pass without showing any tendency to cut out when subjected to ordinary physiological strain. In operations designed to close gaps in which the edges cannot be drawn together the living sutures have the advantage over patch transplants that they do not depend for their success on the process of healing by scar tissue, but solely on the mechanical grip which they obtain on the edges of the ring. By weaving the sutures across the gap, as in the darning of a sock, a wall of great strength can be constructed which can be depended upon to resist successfully any ordinary degree of intra-abdominal pressure and any ordinary muscular strain.

During our experimental investigations and in all the various operations in which the principle has been used, we have found certain points in technique worth observing. To avoid wasting valuable time in threading the needle we use a needle with a large eye. The strip of fascia is tied securely into the needle with catgut or silk, to prevent unthreading, and a ligature of catgut is tied around its terminal end to prevent it from splitting. In taking the first stitch the needle is

passed through one of the edges of the gap to be closed and then through the terminal end of the suture, and drawn taut. (Fig. 7, [1]). By this means a sort of slip-knot is provided, which forms an excellent anchor. Where it is expected that great strain will be placed on the suture, we sometimes take a second similar stitch to make doubly sure that the anchor will hold. The closure of the opening is then proceeded with. The suture is woven strongly into the edges with as many bites as seem necessary and passed backward and forward across the opening until its whole length is closed. Owing to the slippery character of the fascia, it will be found useful to anchor the sutures at every second or third stitch by some form of knot. We usually combine a single loop knot with transfixion as shown in the diagram

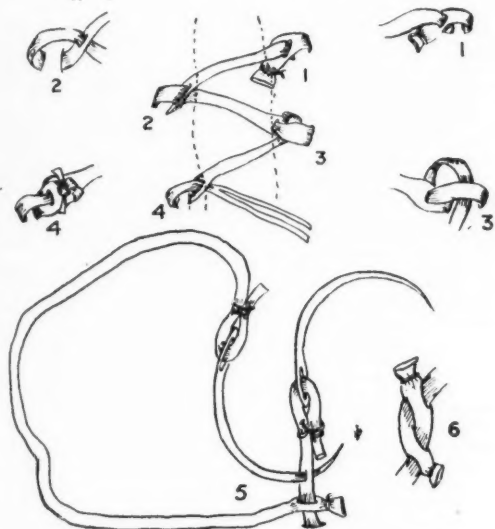


FIG. 7

Diagram showing method of inserting fascial suture. (1) Anchoring suture at its commencement by looping it through itself. (2) Fixation of suture at each loop by passing it through itself. (3) Fixation by transfixion and knot. (4) Ending of suture by passing through itself, splitting, and tying end in knot. (5) Method of joining new suture to one that has been inserted. (6) Join completed.

(Fig. 7, [3]). When the first suture has been used up a second may be attached to it in the same way as pieces of tennis gut are fastened together, (Fig. 7, [5 & 6].) and the sewing continued. The suture may be ended by splitting the terminal end and tying the two strands thus produced about itself in a triple knot. (Fig. 7, [4]). This knot should be made secure by transfixing it with a catgut ligature which will

hold its loops in contact until they become firmly healed together.

Inguinal hernia is a condition which is generally supposed to be readily curable by operation. Published statistics, such as those of Coley, in which thousands of operations are recorded with less than one per cent. of recurrences, amply support this idea. If these statistics are analyzed, however, it will be found that the great majority of the operations have been performed on children in whom the cause for the hernia may be entirely attributed to an error in development which results in the persistence after birth of a patent funicular process. In these patients there is no defect in the abdominal wall and a cure can be confidently expected if the sac is completely removed. What one does to the abdominal wall in these cases appears to be of very little importance, for all the modern methods seem to be equally successful and these include some in which no suturing of the muscles or aponeurosis is performed. In adults, however, the problem is different, for here in addition to the sac one has to deal very frequently with a definite defect in the abdominal wall. This defect may be the simple result of the chronicity of the hernia which after the lapse of years has so distorted the inguinal canal that it has lost its original obliquity and is now a more or less direct passage through the abdominal wall. In other cases the primary defect is in the abdominal wall itself, which for one cause or another becomes so weak that it is unable to withstand the intra-abdominal pressure. The result is a direct hernia. Both these types of hernia present an entirely different problem from the hernia of childhood, and all thoughtful surgeons must admit that the results of operation for their cure are by no means ideal. In direct hernia the published records indicate that recurrences can be anticipated in nearly fifty per cent. of the cases operated upon, and the percentage increases with the age of the patients. So small are the chances of obtaining a cure in patients over fifty years of age that most surgeons advise these patients to content themselves with some form of truss.

From the considerations which have been outlined above, the reason for the high percentage of recurrences is obvious. In practically all operations used in the treatment of inguinal hernia, the hope of a cure is based on the closure of the weak spot in the abdominal wall by suturing together the muscles and aponeuroses which form its boundaries. After the removal of the

sac, the internal oblique muscle and the conjoined tendon are sewn to the reflected portion of Poupart's ligament and the patient kept at rest until it is thought that these structures are firmly healed together. Unfortunately the muscles and aponeuroses do not always remain healed together. If the operation has been done without the thorough removal of areolar tissue and scarification of the sutured surfaces, they will return to their natural position soon after the sutures cease to be effective, and, even when care is taken to scarify the edges of the muscles and aponeuroses, a considerable percentage of recurrences must be anticipated where the primary cause of the hernia, such as increased abdominal tension or hard physical labour, is still active after the operation. In these cases the gradual stretching of the scar frequently leads to a recurrence of the abdominal defect, particularly in the region of pubic spine. But it is chiefly in direct inguinal hernia, in which the primary cause is weakness of the abdominal muscles, that failures are frequent. Here it does not much matter whether the line of suture holds or not, for the hernia will recur by pushing its way through these muscles themselves. To overcome this tendency some operators resort to the absurd method of inserting their sutures far back in the rectus sheath and abdominal aponeurosis, and dragging these structures into contact with Poupart's ligament. As a result the patient is doubled up in a most uncomfortable manner and he remains so until the sutures give way and the stretching of the scar allows the abdominal muscles to return to their natural position. Clinical and experimental evidence have demonstrated the folly of expecting the edges of aponeurotic structures to remain together under high degrees of strain.

The use of living sutures appears to have solved most of these difficulties. The general plan of our operation resembles that of Bassini. The sac is removed, the spine and crest of the pubic bone exposed, and the recurved edges of Poupart's ligament, the internal oblique muscle and conjoined tendon, and the junction of the internal oblique muscles in the abdominal aponeurosis thoroughly cleared. Through a long incision on the outer side of the opposite thigh the fascia lata is exposed and cleared of areolar tissue. With a knife a small incision is made in the fascia, parallel with its fibres, and with a blunt-pointed scissors the fascia is ripped to the desired length, nine or ten inches if possible. A

similar incision is made a quarter of an inch lateral to the first one and one end of the suture thus prepared is cut free from the thigh. It is then tied into the large-eyed needle with catgut and finally lifted free of the muscles and severed at the end which is still attached. About this end is tied a catgut ligature to prevent it from becoming frayed. The strip of fascia is then transferred to the hernial wound and the suturing commenced. The anchoring stitch is passed through the anterior layer of the rectus sheath and the rectus muscle, close to their attachment at the pubic bone. From here it crosses the gap in the abdominal wall to the pubic spine, where it is securely fixed into the periosteum and termination of Poupart's ligament. In this way a strong support is provided at the place where hernias are most apt to recur. The suture is then continued in an outward direction, closing the edge of the internal oblique muscle to the recurved portion of Poupart's ligament, until the internal ring is reached. Here the suture is knotted and then passed to the outer side of the cord, as shown in (Fig. 8), so that a

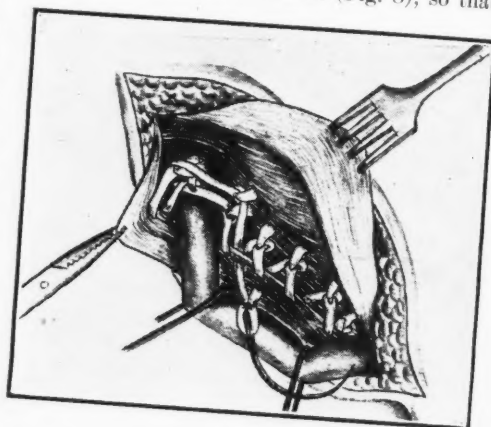


FIG. 8
Repair of inguinal hernia. Insertion of first row of fascial sutures, and reinforcement of internal ring.

new ring of fascia lata is formed. By this means the weak spot produced by the passage of the cord through the abdominal wall is adequately supported. In some cases this single line of sutures might be sufficient to establish a cure, but, in the majority of patients with direct hernia, the abdominal muscles are so weak that they cannot be depended upon to resist severe intra-abdominal pressure. To prevent the possible stretching of the internal oblique muscle, therefore, we insert a second line of sutures, super-

imposed on the first, which passes from the strong abdominal aponeurosis at the junction of the internal and external oblique muscles and from the anterior sheath of the rectus to Poupart's ligament. (Fig. 9). No attempt is made to

had an opportunity to examine the patients or to see all the operations, they are not included in this report. Our own series is composed of sixty cases, the great majority of which were either direct inguinal hernias, or direct or indirect

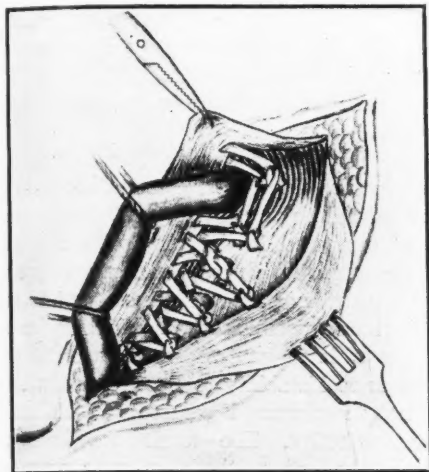


FIG. 9

Repair of inguinal hernia. Insertion of second row of sutures. These are fixed above by a deep bite into the line of junction of the internal and external oblique aponeurosis, and are placed somewhat more closely together than in the illustration.

draw these aponeurotic structures tightly together. The sutures are simply drawn sufficiently taut to make them lie flat. They are placed close together and made to pass under or through the first line of sutures, as in the weaving of a basket. In this way the weak spot in the abdominal wall is completely and permanently covered in by muscle and strong fascia and, if care is taken in securing good anchorage for the sutures, there would appear to be no possibility of a hernia ever pushing its way through. The cord is now dropped back into its new bed and the external oblique closed. In cases in which this structure is strong it is simply sutured with catgut but whenever it is stretched or weakened in any way it is woven together with a narrow strand of fascia. (Fig. 10). Great care is taken in making the new external ring to see that it fits the cord closely and that it is situated in front of the pubic bone. By these precautions a potential weak spot is avoided.

Our clinical experience with the treatment of inguinal hernia by living sutures is now quite extensive. The method has been used in many cases, also, by our *confrères*, but as we have not

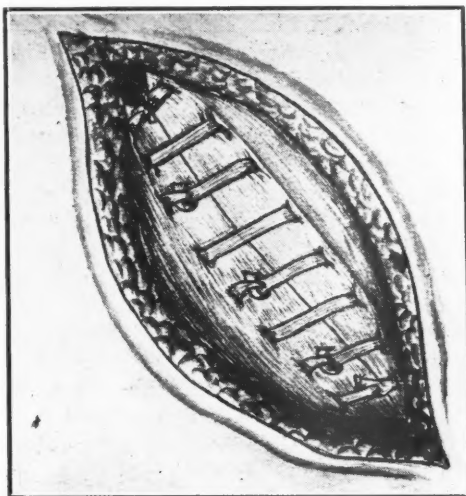


FIG. 10

Repair of inguinal hernia. Closure of external oblique aponeurosis.

hernias which had recurred after operation. Ten of the cases had been operated upon twice or three times previously and consequently offered a severe test to the efficiency of any new operative procedure. No cases are reported in which at least two years has not elapsed since the operation, and, in most instances, four years have gone by since the method was employed. In this series there have been no recurrences. The abdominal wall in each case is very strong and there is no sign of bulging and no complaint of the pain or tenderness which is the usual precursor of recurrence. In some of the cases the knots and strands of the suture can be felt distinctly through the skin after the lapse of from three to four years. We are in high hopes, therefore, that we have solved the difficulty of curing this hitherto troublesome condition.

In order that there may be no misunderstanding as to what cases we consider require this form of treatment, we shall outline our views briefly. It is unnecessary, of course, in children and also in young adults suffering from recently discovered oblique hernia. For all cases of direct inguinal hernia, however, and for all cases of oblique inguinal hernia which have recurred after opera-

tion, or which have appeared for the first time in patients at or beyond middle life, we feel that closure of the canal with living sutures offers the best prospect of a cure. We recommend it also in adult patients who have had the hernia for a long time and whose inguinal canals have, as a result, lost their obliquity. So confident are we that the sutures of fascia lata, if firmly anchored into unyielding aponeurotic structures, will permanently close the inguinal canal, that we cannot conceive of a hernia so unfavourable that a permanent cure could not be anticipated.

We have, unfortunately, not had an opportunity to test the method thoroughly in femoral hernia, but the small experience we have had has convinced us that it will be as useful here as in inguinal hernia. After the removal of the sac, the cure of femoral hernia is entrusted to the closure of the femoral ring by stitching the recurved portion of Poupart's ligament to the thickened portion of the ileo-pectineal fascia known as Cowper's ligament. This is sometimes done through an incision in the thigh, and sometimes through the ordinary inguinal hernia incision. The latter is the more rational approach, as through it the canal can be closed off at its entrance. Our researches have shown, however, that any method of suture with absorbable or non-absorbable material, of structures such as Poupart's ligament and the pectineal fascia, which tend with every contraction of the abdominal or thigh muscles to draw apart, cannot be considered satisfactory, as the ultimate union of these structures must depend on areolar or scar tissue. The high percentage of recurrences amply supports this view. When sutures of fascia lata are used it is no longer necessary to draw Poupart's ligament tightly down to the pectineal fascia, as the femoral ring can now be closed off equally effectively by a strip of fascia anchored into Poupart's ligament, which crosses the mouth of the crural canal to a second anchorage in the pectineal fascia or the periosteum of the ramus of the pubic bone. This suture is passed backward and forward until the opening is thoroughly closed off. It should catch into Gimbernat's ligament on the inner side and the sheath of the femoral vein on the outer side. It is simply drawn sufficiently tight to make it lie flat, and so does not cause any constriction of the vessels as they pass into the thigh. Such an operation is, in reality, an effort to extend Gimbernat's ligament in an outward direction

so that its base, instead of forming the internal boundary of the femoral ring, now forms the inner boundary of the compartment of the femoral sheath through which passes the femoral vein. The extended ligament, therefore, shuts off the opening of the crural canal. We have not had sufficient clinical experience with this method to know whether the final results will be as satisfactory as in inguinal hernia, but, from a theoretical standpoint, we are quite satisfied that they will.

While the various types of inguinal and femoral hernia often give disappointing results after the ordinary types of operation, they cannot be compared in difficulty with the large ventral hernias which are constantly appearing for treatment, nor are the general results anything like so unsatisfactory. No surgeon approaches a large ventral hernia without misgivings as to his ability to close it, and without fear that the closure, if secured, will ultimately prove ineffective. The result has been the multiplication of methods of procedure, all searching for methods of securing more stable healing of the edges of the opening, or of reducing the strain to which the line of union is subjected. Thus have been introduced the various methods of overlapping the muscles and aponeuroses, the use of the wire filigree, and the employment of large patches of fascia lata. With the exception of the wire filigree, which has its own peculiar disadvantage, all these methods have the same defect in that they are depending for permanent closure on scar or areolar tissue. This is the condition to which the principle of living sutures is most readily applicable, and in which its use will give the most immediate brilliant results. We are no longer greatly concerned as to whether we can actually draw the edges together or make them overlap, for we know that we can almost as effectively close the opening by weaving in the strips of fascia lata. We also know that these fascial sutures cannot stretch or break, and, if we weave them securely into resistant structures in the edges, they will maintain the closure of the opening for all time.

The technique is perfectly simple. The sac is removed and the peritoneum closed as in the ordinary operation. The edges of the opening are thoroughly exposed and may be dissected so as to demonstrate their various anatomical layers. If this cannot be done without greatly weakening these layers, however, it is better to

dispense with it and trust to the grip of several layers of sutures into the matted edges. The sutures are inserted, as already described, until not a crevice is left through which the peritoneum can protrude. (Fig. 11). It is wise to overlay the first row of sutures with others which are woven into strong tissues well back from the edges of the opening, somewhat as in the lacing of a shoe. (Fig. 12). These correspond with the superficial layer described in the closure of direct inguinal hernia, and are of value in diffusing the strain.

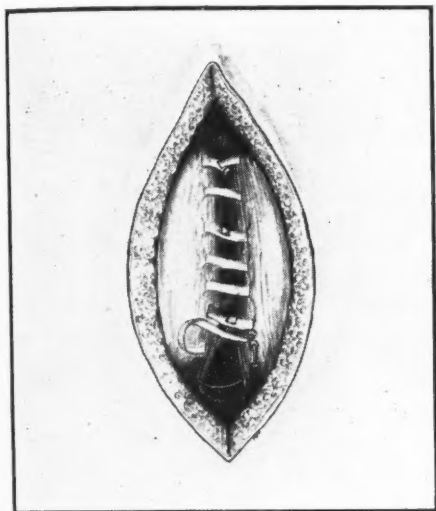


FIG. 11

Repair of ventral hernia. Insertion of first row of fascial sutures, bringing edges of defect as nearly as possible together.

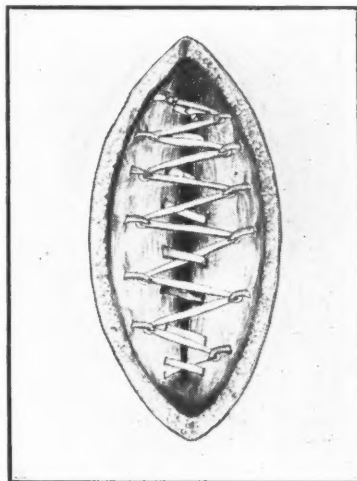


FIG. 12

Repair of ventral hernia. Insertion of second row of sutures, fixed at points some distance back from the edge. At each point of insertion the suture is knotted to prevent slipping. The sutures should be inserted somewhat more closely together than shown in the diagram.

Our experience with this type of operation has been most satisfactory. The cases have all been difficult ones, and of such enormous size that there was practically no hope of permanent closure from the ordinary operation. Up to the present time there have been no recurrences. One case will serve to illustrate the value of the method. A soldier was admitted to Christie Street Hospital with a huge ventral hernia resulting from a shell wound which had torn away the upper half of the right rectus muscle and the adjacent abdominal muscles and aponeuroses. The hernia was half the size of a football and the ring measured seven inches by four. All who saw him agreed that he could not be cured by any of the recognized methods. This man was operated on as described. The edges of the opening were left as a solid mat, and were drawn as

unable to detect any disability resulting from the operation. When the required number of sutures have been removed, the gap in the fascia is simply closed with catgut, and by the time the patient is ready to get out of bed the wound in the thigh is firmly healed. In several instances we have been unable to close the gap in the fascia but in no case has a disability resulted.

Since this paper was read at the meeting of the Ontario Medical Association at Niagara Falls, two years have been allowed to elapse before presenting it for publication. This has been done deliberately in order that the statements

made at that meeting might be subjected to the test of time. We feel that we are now in a position, both from our own experience and that of our colleagues, to recommend the general adoption of the principles outlined. If these

principles are followed, we believe we have at our command a method of dealing with doubtful and difficult hernias which will give general satisfaction and considerably widen the field to which surgical treatment is applicable.

INSULIN: ITS ACTION: ITS THERAPEUTIC VALUE IN DIABETES, AND ITS MANUFACTURE

THE INSULIN COMMITTEE OF THE UNIVERSITY OF TORONTO

CARBOHYDRATES, such as the starches, taken in the food, are converted into simple sugars, such as glucose. In this form it is absorbed by the intestines and carried to the liver where much of it is stored as glycogen. The remainder is carried to the muscles and other tissues where some of it is oxidized and some stored as glycogen. Prior to these changes, glucose in some way becomes altered in chemical structure so as to change it from an inactive into an active form. In diabetes mellitus it is probable that the sugar absorbed from the intestine is no longer properly changed into the active form so that it cannot be stored in the liver as glycogen, nor oxidized in the tissues, but circulates in increased quantities in the blood (hyperglycaemia) and is excreted in the urine (glycosuria). It therefore becomes lost to the body as a source of energy. As a result, the source of glycogen is rapidly exhausted, and protein is attacked as a source for glucose. Further, as carbohydrate is necessary for the normal metabolism of fat in the body, incomplete combustion of fat occurs in diabetes mellitus, resulting in diabetic acidosis and coma. Diabetes mellitus must, therefore, be considered as a disease of metabolism in which carbohydrate is not sufficiently utilized by the body, thereby causing a derangement of the normal metabolism of proteins and fats as well as carbohydrates. This derangement of metabolism is recognized by voracious appetite, hyperglycaemia (increase in the percentage of sugar in the blood) and glycosuria (sugar in the urine).

Discovery of Insulin

As a result of the experiments of Von Mering and Minkowski, in which they showed

that extirpation of the pancreas in dogs was followed by persistent glycosuria and other symptoms of diabetes, the important relation between this gland and diabetes was established. The pancreas consists of two types of tissue; the acinar portion secreting the pancreatic juice (the external secretion) which reaches the intestine through the pancreatic duct, and groups of cells scattered throughout the gland known as "the islands of Langerhans." These cells possess a rich supply of blood vessels. As the islands of Langerhans show pathological changes of varying degrees up to complete destruction in the majority of cases dying of diabetes mellitus, Opie and others have considered that the insular portion of the pancreas is the one related to diabetes mellitus. They believed that it probably furnished an internal secretion necessary to normal carbohydrate metabolism. Several investigators attempted to prepare extracts of pancreas containing this internal secretion but with uncertain results, probably because the active substance was destroyed by the powerful digestive ferments also present in such extracts. It has remained for Banting, working in collaboration with Best in the department of Physiology, under the direction of Professor MacLeod, to demonstrate that such an internal secretion really exists, and thereby to determine the exact relationship of the pancreas to the disease diabetes mellitus.

It had been shown previously that, if the duct of the pancreas was ligated, degeneration occurred much more rapidly in the acinar portion than in the islands of Langerhans. Banting conceived the idea that, if an extract was prepared from the pancreatic tissue remaining some time after ligation of the ducts, it should contain the supposed internal secretion of the islands of

Langerhans because there would not be enough of the digestive ferments to destroy it. In 1921, Banting and Best prepared an extract of the degenerated pancreas and injected it into diabetic dogs. Following the injection a definite lowering of the blood sugar, and a decrease in the amount of sugar excreted in the urine was found to occur. They were able to show that, if sufficient extract was injected at proper intervals, completely depancreatized dogs could be kept alive and free of symptoms for a long period of time. These experiments proved that the islands of Langerhans in the pancreas contain a substance which lowers the blood sugar and diminishes or abolishes the excretion of sugar in the urine of diabetic dogs. Later, by extracting the foetal or adult normal pancreas with alcohol, they prepared an extract which contained the antidiabetic substance or hormone, the alcohol evidently preventing the destruction of the active principle by the digestive ferments. This extract was injected subcutaneously into a boy suffering from severe diabetes mellitus. A definite lowering of the blood sugar, and of the amount of sugar excreted in the urine resulted. The extract contained other substances which caused considerable local irritation, making repeated injection of the material in that form impossible. With the assistance of J. B. Collip, an extract was prepared in a purer form, suitable for repeated injection in man. The active principle of these extracts has been called "Insulin" a name previously suggested by Sir E. Sharpey Schafer.

Physiological Action of Insulin

At this stage intensive investigation was conducted in the physiological laboratory of the University to determine the effects of insulin on normal and diabetic animals. By excellent team work, in which the previously mentioned investigators and E. C. Noble, J. Hepburn, J. K. Latchford and others participated, it was possible in a comparatively short time to show among other things:

(1) That insulin lowers the blood sugar in normal rabbits; that characteristic symptoms supervene when a certain low level is reached, and that these symptoms are specifically counteracted by glucose.

(2) That it may prevent the hyperglycaemia due to pique, asphyxia, epinephrin and ether.

(3) That it increases the sugar consumption by the isolated mammalian heart.

(4) That it causes glycogen to be deposited in the liver of diabetic animals fed with sugar.

(5) That it raises the respiratory quotient of diabetic animals fed with sugar.

(6) That it affects the migration of fat in diabetic animals.

(7) That it causes the acetone bodies to disappear from the urine of diabetic animals.

The Dosage of Insulin

A physiological unit of insulin was originally defined as that amount which lowers the percentage of sugar in the blood of a normal rabbit, weighing 2 kg. and starved for twenty-four hours, to 0.045 per cent. within three hours. Because this amount of insulin is said to be greater than that required in the treatment of certain cases of diabetes in man, it has been found advisable to designate as one clinical unit one third of the above physiological unit. This clinical unit has been adopted on the labels of all preparations of insulin manufactured for use in man. In carrying out the actual assays on rabbits considerable variations are found in the extent to which different animals react to equal doses of insulin. It is necessary, therefore, to use many animals for the assay of each sample of insulin, and to take the average of the higher results obtained. Much work is being done using various other animals than the rabbit (mouse, diabetic dog) in an endeavour to improve the method of assay. In large diabetic clinics a valuable assay can be obtained by determining how many extra grammes of carbohydrate can be metabolized per unit of insulin. For this purpose, "pedigree" patients must be used, *i.e.*, patients that have been under observation for a long time, and in whom the carbohydrate balance is precisely known.

The Therapeutic Action of Insulin and its Value in the Treatment of Diabetes

Having found a method for the preparation of insulin in suitable form, it was now possible to test its value in the treatment of diabetes mellitus. This has been done partly in the medical clinic of the University of Toronto, under the direction of Dr. Duncan Graham, and partly in various clinics in the United States. Further investigation on the administration of insulin in diabetic dogs, and in severe cases of diabetes mellitus have shown that the injection of insulin restores to the body this lost ability

to oxidize carbohydrates, and glycogen is again stored in the liver. This it evidently does by converting glucose into the active form, and if insulin is given in sufficient quantity and at proper intervals, the blood sugar is maintained at a normal level and the urine remains free of sugar. Fat is also completely burned. As a result of this, acetone bodies disappear from the urine and diabetic acidosis and coma are prevented. In brief, the artificial administration of insulin restores to the body a normal metabolism of carbohydrates, fats and proteins.

Although the administration of insulin is capable of relieving the cardinal symptoms and signs of diabetes mellitus, *one must not conclude that insulin can replace the dietetic treatment of the disease.* In diabetes there is a decreased production of insulin, due to the weakened function of the islands of Langerhans. As all cases of diabetes mellitus are capable of metabolizing a certain amount of carbohydrate, the degree of damage to the islands and their capacity to produce insulin may be ascertained by estimating the tolerance of the patient for carbohydrate. The etiological factor or factors causing this damage to the pancreas have not been discovered. It is known, however, that diets containing excessive quantities of carbohydrates, or proteins, fats and carbohydrates in improper proportions or quantities, as well as infections, further weaken the function of the already damaged pancreas. The object of treatment should be to give rest to the damaged islands and conserve their power to produce insulin. Before the introduction of insulin this was accomplished best by the dietetic treatment outlined by Allen, Joslin and others. By marked restrictions in diet, combined with periods of fasting, Allen demonstrated that, even in severe cases of diabetes, the urine could be kept free of sugar, and the blood sugar maintained at a normal level for long periods of time. Later, many patients remained aglycosuric without the necessity of fasting. This method of treatment gave a maximum of rest to the damaged pancreas, and allowed it to maintain, or even increase its power to produce insulin. The lives of severe cases of diabetes were definitely prolonged, whereas mild cases regained sufficient tolerance for carbohydrates to allow them to take a more liberal diet and yet remain free of symptoms. Unfortunately, the extreme under-nutrition resulting from the prolonged use of the restricted diet with fasting caused a marked loss of weight

and strength and made the continuation of the treatment difficult.

The introduction of insulin in the therapy of diabetes makes it possible to begin the treatment of even severe cases with a palatable diet of protein, fat and carbohydrate in adequate quantities to meet the requirement of the body at rest in bed, or with moderate exercise, and at the same time afford adequate rest to the damaged islands of Langerhans. After the glycosuria and ketonuria have disappeared, and the blood sugar level has returned to normal, the diet may be gradually raised until the patient is receiving sufficient to maintain the body weight slightly below normal, and sufficient calories are being supplied for the body to perform the ordinary duties of life. In some cases the pancreas has so regained its power to produce insulin that the daily dosage need not be increased; in others, where the damage to the pancreas is more permanent, sufficient additional insulin must be given to keep the urine of the patient free of sugar on the increased diet.

Overdosage of insulin is followed by the development of serious signs and symptoms demanding immediate treatment. The patient complains of a sense of weakness and fatigue, associated with sweating, a feeling of tremulousness and sometimes pallor and flushing. In the more severe forms there is acute distress with mental disturbances and even unconsciousness. These reactions are due to a fall in the blood sugar below the normal level of 0.1 per cent. When the blood sugar falls to 0.07 per cent., symptoms develop, and if it falls to 0.035 per cent. the patient becomes unconscious. The symptoms, though alarming both to the patient and those in attendance, are completely relieved if glucose is given immediately.

Indications for the Use of Insulin

The indiscriminate use of insulin in the treatment of diabetes mellitus is a real source of danger. At the beginning of treatment all cases of diabetes mellitus, except those suffering from severe acidosis and coma, should be put to bed and given a basal maintenance diet. This diet contains protein sufficient to replace the daily wear and tear of the tissues of the body, approximately 0.3 gm. per pound of body weight. Additional calories in the food are supplied by carbohydrate and fat in proper proportion to prevent the production of acetone bodies, and in adequate

amount from the height, weight and sex of the patient. If the urine of the patient becomes free of sugar on this diet it should be gradually raised until he is receiving an adequate diet for the performance of the ordinary duties of life. Should the patient remain aglycosuric on this diet, insulin treatment is not indicated. Approximately seventy-five per cent. of diabetics may be controlled by dietetic treatment. Some clinicians, however, prefer to use insulin in addition to dietetic treatment in the moderately severe cases.

If, at the end of a week's treatment on a basal diet, the urine is not free of sugar the patient requires insulin. The amount of insulin to be injected daily is dependent upon the total amount of glucose found in the urine at the end of the preliminary period of observation. It is given in divided doses, injected subcutaneously, usually before breakfast and supper or, in more severe cases, before each meal. Under combined dietetic and insulin treatment the patient rapidly improves. As the body is supplied with an adequate amount of insulin, the carbohydrate is properly metabolized; sugar and acetone bodies disappear from the urine, and the blood sugar returns to a normal level. The patient enjoys his food, feels stronger, and the mental depression so characteristic of the severe diabetic is replaced by cheerfulness. Some patients have been able to resume their former occupations after a month's treatment. Further details of clinical experiences with insulin will be found in the articles of Banting, Campbell, Fletcher, Allen, Joslin, Fitz, Geyelin, Wilder, Williams, etc., in the current number of the *Journal of Metabolic Research*.

Probably the most brilliant results obtained with insulin have been in the *treatment of diabetic acidosis and coma*. In these cases insulin must be given immediately. All cases of acidosis and threatened coma react favourably to combined dietetic and insulin treatment. In uncomplicated cases of advanced coma, the majority—four out of six—have recovered after being given repeated intravenous injections of insulin combined with an adequate amount of glucose to prevent the blood sugar from falling to a dangerous level. All the other fatal cases of coma treated had an associated infection sufficiently severe to cause death apart from the diabetic condition.

The susceptibility of the diabetic to infection has long been recognized. The effect of a de-

veloping infection or a surgical operation upon the future course of a case of diabetes was feared by the physician. These, combined with acidosis and coma, constituted danger points in the life of the diabetic. If infection develops, or an operation becomes necessary in a case of diabetes adequately controlled by diet, sufficient insulin should be given to keep the urine free from sugar and acetone until the patient recovers. In more severe cases of diabetes already under insulin treatment the daily dose must be increased. Under combined dietetic and insulin treatment diabetics have recovered from mild infections in a normal period of time; teeth have been extracted, tonsils removed, and amputations performed with safety.

Diabetes mellitus can be successfully treated in the less severe form by giving a properly balanced diet; in the more severe, by proper diet and an adequate daily dosage of insulin. The success of treatment is dependent upon the physician for the institution of proper treatment, and upon the patient for the continuation of the treatment prescribed. A prescription of a properly balanced diet is of as much, or even greater importance for a case of diabetes mellitus than is one of drugs in the majority of the diseases the physician is called upon to treat. In the beginning of treatment the value to the patient of the month or six weeks stay in an institution with proper facilities for the investigation and dietetic control of cases of diabetes mellitus cannot be overestimated. The case can be more fully investigated and the effect of an accurate diet carefully controlled. The patient appreciates more readily the value of proper diet in the treatment of his condition, and becomes familiar with the character, amount and preparation of the various foodstuffs constituting his diet. In an institution the tuberculous patient learns how to live; the diabetic, what to eat.

The Manufacture of Insulin

Since the method for the manufacture of insulin from slaughter house material demands the greatest of care and the strict observance of certain principles of extraction, and since it has been found that toxic symptoms are readily caused by excessive dosage, steps have been taken by the University of Toronto to ensure the proper manufacture of insulin, and to provide for some measure of control over its distribution among the medical profession. The history of the vari-

ous steps is briefly as follows: After it was discovered that an active non-irritating preparation of insulin could be prepared on a small scale by extraction of the pancreas with weak alcohol and then purifying the extract by fractional precipitation with stronger alcohol, attempts were made to expand the scale of productions so as to yield sufficient material for clinical use. Great difficulties were encountered in this work, and for over two months scarcely any insulin could be obtained. When the difficulties were at last overcome and a reliable large scale procedure had been definitely elaborated in detail, the question of publication of the method came to be considered. It was pointed out, however, that such publication of the method would probably result in some commercial firm modifying the process sufficiently so as to obtain a patent which would give them a monopoly in manufacture, and that the only satisfactory way to prevent this was for the chief originators of the method to apply for such patents in their own names and to assign these, when granted, to some non-commercial organization to administer in such a way as to prevent commercial exploitation of the product. Application for process and product patents were, therefore, filed and the Board of Governors of the University of Toronto was requested to accept these patents and to assume responsibility for their administration on the basis, first, that the "patent" is not to be used for the purpose of restricting the preparation of this or similar extracts elsewhere, or by other persons" and second "that the University holds the patent for the sole purpose of preventing any other person from taking out a similar patent, which might restrict the preparation of such extract."

The Board of Governors accepted the trust and appointed a committee composed of Colonel A. E. Gooderham (as Chairman) Sir Robert Falconer, President of the University, Mr. T. A. Russell and Sir Joseph Flavelle, and an advisory committee, the *personnel* of which is as follows: Dr. J. J. R. MacLeod (*secretary*), Dr. F. G. Banting, Mr. C. H. Best, Dr. J. G. Fitzgerald, Dr. R. D. Defries, and Dr. Duncan Graham, with Mr. C. H. Riches, as legal advisor.

One of the first questions to be considered by the committee related to further expansion in the manufacture of insulin. Since, however, a large scale method had not yet been sufficiently evolved to ensure a product of constant potency, it was decided before issuing licenses to manufacturers to develop the details of such a method.

At the same time it was realized that adequate facilities for doing this on a practical manufacturing scale could not be provided for unless by collaboration between the committee and some highly organized firm or firms engaged in the manufacture of animal extracts of a similar nature. And since it was also evident that such collaboration could not be carried out satisfactorily with several firms at one and the same time, it was decided after careful consideration to invite the Eli Lilly Co., of Indianapolis, to send representatives to Toronto to confer on the question. As a result of this conference an agreement was entered into whereby the above mentioned firm was granted an exclusive license in the United States for the manufacture of insulin for an experimental period set provisionally at one year, under the following conditions:

1.—That the firm utilize all of its available facilities and personnel for the manufacture of the product and pay all expenses entailed in its large scale manufacture in their plant.

2.—That the firm submit samples of their product to the University of Toronto, for approval before distribution to physicians for use on patients.

3.—That the approved product be distributed either *gratis* or at cost price only to such physicians as may be chosen in consultation with the University of Toronto.

4.—That a certain percentage of the approved product be given *gratis* to the University of Toronto for use in its experimental laboratories, and for clinical purposes in its associated hospitals.

5.—That after the expiry of the experimental period the firm be licensed by the University of Toronto to manufacture the product under the same favourable terms as may be granted to other firms operating in the same territory.

In consideration of the acceptance of these conditions (contained in an agreement between the firm and the University of Toronto signed, May 31st, 1922) all known details of the method of manufacture of insulin were given to the Eli Lilly Co., and work was immediately started by it on a large scale.

Having made these arrangements for a gradual expansion in the manufacture and clinical use of insulin in the United States, the Committee now took up the question of its control along similar lines in Great Britain, and it was decided to apply for patents in that country and to recommend to the Board of Governors that these, when

granted, should be assigned to the Medical Research Council of Great Britain on the same general terms as they had been assigned to the University of Toronto, namely, to administer as they deemed best for the purpose of preventing commercial exploitation and uncontrolled manufacture in that country.

During the latter part of 1922, intensive work on the manufacture of insulin, both in Indianapolis and Toronto resulted in the gradual increase of the output, so that it became possible to offer insulin for clinical trial to a large number of physicians whose reports on its therapeutic actions have been of great value in guiding the committee and the manufacturers in questions of suitable dosage, possible risks from overdosage, and the elimination of irritating impurities. This insulin was distributed free of cost by the Eli Lilly Co.

The large expenses incurred by the collaborating firm up to this stage made it necessary for them early in 1923 to put a cost price on their product. With the approval of the Committee of the University of Toronto, the number of collaborating physicians was also increased so that there might be in each large centre of the United States at least one clinic in a position to undertake treatment of emergency cases of diabetes by the use of insulin. Arrangements were also made through the Connaught Laboratories to undertake a similar expansion of distribution in Canada.

Through the whole-hearted collaboration of the University and the Eli Lilly Co., and the valuable assistance of its scientific advisor, Dr. G. H. A. Clowes, a large scale production of insulin has been carried forward at a satisfactory speed, and it is hoped that it will be possible at an early date to terminate the experimental period. That the policy as outlined above has been justified is exemplified by the fact that several firms have exploited for the treatment of diabetes entirely worthless preparations to which they have given names so closely similar to "Insulin" as to convey the impression that they contain the anti-diabetic hormone. While no other harm may come of this than that useless medicine is taken, it indicates that deaths from overdosage might have occurred in practice had the method for the manufacture of potent preparations of Insulin been made available without any control, and without some supervision over its distribution. Under such conditions the market would by now be flooded with

preparations of unknown potency and durability, and serious accidents would inevitably have resulted because of overdosage.

The method of gradual expansion in the clinical application of insulin has eliminated the risks of such accidents. That these would certainly have occurred had insulin been made freely available in the profession will be sufficiently clear from the description of its use which is given in a preceding part of this article. Even at the risk of repetition, it should be pointed out that the symptoms of hypoglycaemia due to an overdose of insulin may come on while the patient is asleep, and also that they are sometimes not unlike those of the late stages of many cases of coma. When insulin is used for the treatment of diabetic coma, therefore,—and its value here is unquestioned—the physician must see to it that the blood sugar is not lowered to the level at which hypoglycaemia symptoms supervene. Experience has shown that these symptoms can be recognized at their onset and their development, so that, their occurrence is no longer to be feared as a risk.

It is expected that insulin will be available in general practice within the next few months, and in anticipation of this it is strongly urged by the Insulin Committee that physicians who may desire to employ this useful antidiabetic remedy in practice, should visit some clinic in which it has been in use. This is advisable, not only in order that they may become familiar with questions of dosage, and the treatment of cases showing symptoms of overdosage, but also that they may learn to recognize the type of case it should be prescribed for. It should be remarked in this connection that many, if not most cases of diabetes can be adequately treated by dietetic measures alone, and that the necessity for insulin treatment can be determined only by careful clinical study.

Future policy of the University of Toronto

Now that a satisfactory process has been worked out for the manufacture of insulin on a large scale, the Insulin Committee considers that at the expiration of the temporary agreement with the Eli Lilly Co., licenses to manufacture insulin should be granted to other firms who are able and willing to comply with certain conditions imposed by the Committee. The Lilly Co. agrees to assign to the Committee patents covering certain improvements in the manufacture of insulin,

that have been elaborated by them. All information in the possession of the Committee, including the various methods involved in the manufacture of insulin, whether patented or not, will be conveyed by the Committee to the licensed manufacturers, it being understood, however, that they on their part agree to put at the disposal of the Committee any new processes which they may devise, whether patentable or not, and that the Committee may then transmit this information to other manufacturers. In other words, the policy is to be that all patents already applied for and all information concerning the manufacture of insulin will be made available for such manufacturers that satisfy the Insulin Committee that they are in a position to undertake the manufacture of this substance. By this arrangement it is considered that the purposes for which the University of Toronto holds the patent rights will be fulfilled, and that the medical profession will be assured of the most satisfactory product at the lowest cost.

The Insulin Committee desires to express its appreciation of the whole hearted manner in which the Lilly research laboratories have co-operated in working out the problems of large scale production of insulin. Without this collaboration it is unlikely that a non-irritating product of such satisfactory potency and durability could have been produced in adequate amounts to meet the demand of the medical profession, in this comparatively short time.

BIBLIOGRAPHY

- (1) BANTING, F. G., BEST, C. H., AND MACLEOD, J. J. R., *The internal secretion of the pancreas*, Proc. Amer. Physiol. Soc., December, 1923, Am. J. Physiol., 59, 1922, 479.
- (2) BANTING, F. G., AND BEST, C. H., *The internal secretion of the pancreas*, Jour. of Laboratory and Clinical Medicine, 7, 1922, 251-256.
- (3) BANTING, F. G., AND BEST, C. H., *Communication to the Academy of Medicine (Toronto)*, February 7th, 1922.
- (4) BANTING, F. G., AND BEST, C. H., *Pancreatic Extracts*, J. Lab. and Clin. Med., 8, 1922, 464-472.
- (5) BANTING, F. G., BEST, C. H., COLLIP, J. B., CAMPBELL, W. R., AND FLETCHER, A. A., *Pancreatic extracts in the treatment of diabetes mellitus*, The Canadian Medical Association Journal, 12, 1922, 141-146.
- (6) BANTING, F. G., AND BEST, C. H.,

- COLLIP, J. B., MACLEOD, J. J. R., AND NOBLE, E. C., *Preliminary Studies on the Physiological Effects of Insulin*, Transactions of the Royal Society of Canada, Third series, 1922, Vol. XVI, Section V.
- (7) MACLEOD, J. J. R., *Pancreatic extract and diabetes*, Canadian Medical Association Journal, 122, 1922, 423-425.
- (8) BANTING, F. G., BEST, C. H., COLLIP, J. B., MACLEOD, J. J. R., AND NOBLE, E. C., *The Effect of Pancreatic Extract (Insulin) on normal rabbits*, Amer. J. Physiol., 62, 1922, 162-176.
- (9) HEPBURN, J., AND LATCHFORD, J. K., *Effects of Insulin (pancreatic extract) on the sugar consumption of the isolated surviving rabbit heart*, Amer. J. Physiol., 62, 1922, 177-184.
- (10) MACLEOD, J. J. R., *Insulin and Diabetes*, Brit. Med. Journ., Nov. 4th, 1922.
- (11) MACLEOD, J. J. R., *The Source of Insulin*, Journ. Metabolic Research, 11, 1922, 149.
- (12) BANTING, F. G., BEST, C. H., COLLIP, J. B., MACLEOD, J. J. R., AND NOBLE, E. C., *The effects of insulin on experimental hyperglycemia in rabbits*, Amer. J. Physiol., LXII, 1922, 559.
- (13) BANTING, F. G., BEST, C. H., COLLIP, J. B., CAMPBELL, W. R., FLETCHER, A. A., MACLEOD, J. J. R., AND NOBLE, E. C., *The effect produced on diabetes by extract of pancreas*, Trans. Assoc. of American Physicians, 1922.
- (14) MCCORMICK, N. A., MACLEOD, J. J. R., O'BRIEN, M. K., AND NOBLE, E. C., *Experiments on the mechanism of action of insulin*, Proc. Am. Physiol. Soc., 1922, Amer. J. Physiol., LXIII, 1923.
- (15) BEST, C. H., AND MACLEOD, J. J. R., *Some chemical reactions of insulin*, Proc. Soc. Biol. Chem. Journ. Bio. Chem., 1923, LX.
- (16) MCCORMICK, N. A., MACLEOD, J. J. R., NOBLE, E. C., AND O'BRIEN, M. K., *The influence of the nutritional condition of the animal on the hypoglycemia produced by insulin*, Jour. Physiol., 1923, LVII, 234.
- (17) BANTING, F. G., CAMPBELL, W. R., AND FLETCHER, A. A., *Further clinical experience with insulin*, British Medical Journal, Jan. 6th, 1923.
- (18) EADIE, G. S., AND MACLEOD, J. J. R., *The physiological assay of insulin based on its effects on the hyperglycemia following glucose injections and epinephrin*, Amer. J. Physiol., LXIV, 1923, 285.
- (19) BANTING, F. G., BEST, C. H., DOBBIN, G. M., AND GILCHRIST, J. A., *Quantitative parallelism of the effect of insulin in Man, Dog, and Rabbit*, Proc. Am. Physiol. Soc. Am. J. Physiol., LXIII, 1923.
- (20) COLLIP, J. B., *Delayed manifestation of the physiological effects of insulin following the administration of certain pancreatic extracts*, Proc. Am. Physiol. Soc. Am. J. Physiol., LXIII, 1923.
- (21) BANTING, F. G., DOBBIN, G. M., AND GAIRNS, S., *Methods of administration of insulin*, Proc. Am. Physiol. Soc. Am. J. Physiol., LXIII, 1923.
- (22) NOBLE, E. C., AND MACLEOD, J. J. R., *The influence of sugars and other substances on the toxic effects of insulin*, Am. J. Physiol., 1923, LXIV, 547.
- (23) COLLIP, J. B., *The occurrence of ketone bodies in the urine of normal rabbits in a condition of hypoglycemia following the administration of insulin—a condition of acute acidosis experimentally produced*, Proc. Soc. Biol. Chem., Jour. Chem., 1923, LX.
- (24) COLLIP, J. B., *The demonstration of an insulin-like substance in the tissues of the clam (Mya Arenaria)*, Proc. Soc. Biol. Chem., Jour. Biol. Chem., 1923, LX.
- (25) COLLIP, J. B., *The original method as used for the isolation of insulin in semipure form for the treatment of the first clinical cases*, Proc. Soc. Biol. Chem., Jour. Biol. Chem., 1923, LX.
- (26) CAMPBELL, W. R., *Dietetic Treatment in Diabetes Mellitus*, Canadian Medical Association Journal this issue.

Calcareous Degeneration of the Dorsal and Lumbar Aortae as a cause of Backache.—John Ridlon and E. J. Berkheiser, Chicago, state that no examination of a painful back is complete and conclusive without an examination of the circulatory system, and that the treatment of many painful backs ought to be directed by

the internist and not by the orthopedist. The routine employment of girdles, braces and plaster jackets and extension in bed should be regarded with skepticism in the treatment of painful backs. Three cases are reported.—*Journal A. M. A.*, June 23, 1923.

DIETETIC TREATMENT IN DIABETES MELLITUS

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IF one surveys the history of the treatment of diabetes mellitus it becomes apparent that successful treatment, of certain patients at least, has been accomplished in seemingly diverse ways. It is now universally admitted that diet, and not drugs, is the mainstay of any successful treatment of this disease. At various times certain articles of food have been stated to have particularly beneficent properties in controlling the affection. These have had their vogue and have been followed by others for which in turn great things were claimed and denied. The points not generally recognized were—the total glucose content of these diets and the individual variations in the tolerance of different patients for these foodstuffs. Any foodstuff may be suitable for certain diabetics but this same substance may prove most harmful to others. For the less severe cases of diabetes mellitus dietetic control alone will effect a considerable improvement in their condition. For a certain proportion of cases no type of dietetic treatment is adequate in controlling the disease. For such patients, fortunately not a large proportion of the whole class, "Insulin" (an extract of pancreatic islet tissue) has been recently introduced into clinical use in conjunction with dietetic treatment. It may be said, however, that there is no case, whatever its severity may be, in which it will ever be advisable to use insulin without due attention to dietetic principles.

Diabetes is a disease in which the body is unable to efficiently metabolize carbohydrate. It has now been proven by the work of Banting* and others that this is due to insufficient insulin production by the pancreas. Insulin is apparently secreted into the blood stream by the Islands of Langerhans. A number of investigators, notably Opie⁷, Allen² and Conroy⁴ have called attention to the degenerative changes which occur in the islet tissue of the pancreas of severe diabetics. In partially depancreatized animals, Allen^{1,2} has demonstrated that func-

tional and anatomical damage to the islet tissue results from overfeeding, thus indicating the necessity in treatment of keeping the work of the pancreas within the limits of its capacity. The severity of diabetes is in direct relation to the patient's tolerance for "total glucose." This may be determined by placing the patient on a known diet and estimating the amount of glucose excreted in the urine. In calculating the total glucose content of the diet it must be remembered that it consists of 58% of the protein and 10% of the fat (the glycerine) as well as the preformed carbohydrate. When the diet is excessive, clinical cases of diabetes show evidence of damage to the pancreas in the reduced tolerance for total glucose which results. Rest to the pancreas must mean a reduction in the total glucose to be metabolized by the pancreas and the object of treatment should be to accomplish this result by suitable dietetic measures with or without the artificial administration of insulin.

Methods of treatment of diabetes having as a basic principle the reduction in the work required of the pancreas have been introduced by Allen³ and Joslin⁵. Their methods of total dietary restriction and the use of fast days at intervals prolonged the lives of many severe diabetics, and the rest to the pancreas often resulted in an increased output of insulin, the internal secretion, and greater tolerance for total glucose. This permitted of a more liberal diet being used. Though in certain cases of diabetes these methods have served admirably, it is unfortunately true that in other cases the necessary restriction in diet was so severe as to lead to marked under-nutrition. Patients fed insufficiently are partly starved and the body protein and body fat are called upon to make up the minimal number of calories required to sustain life. The under-nourished, severe diabetic is quite unable to perform any useful work and is very subject to infections which may induce a further reduction in tolerance. In the most severe cases the "fasting" treatment actually

*For a bibliography of Insulin see Macleod, J. J. R.: *Insulin and Diabetes*, B.M.J., II, Nov., 1922.

defeats itself as the increased production of carbohydrate from body protein makes it impossible to get the patient aglycosuric. It would appear desirable to avoid these extreme degrees of under-nourishment and to furnish the diabetic with a diet sufficient to satisfy his normal caloric requirements. It is apparent that in such a diet the carbohydrate and protein must remain low in amount since each of these require insulin for their combustion. It has been shown by Marsh, Newburgh and Holly⁶ that two-thirds of a gram of protein per kilogram of body weight is sufficient to maintain nitrogenous equilibrium provided the requirement for calories is otherwise met. The additional calories of the diet must be derived from fat but the complete combustion of this substance takes place only when sufficient carbohydrate is also being burned. When carbohydrate is markedly restricted from any cause, acetone bodies are produced from fat and in diabetics acidosis and coma may result. Woodyatt¹¹ has suggested that one molecule of fatty acid may be completely burned while one molecule of glucose is undergoing combustion. Further work by Wilder⁹ and Schafer⁸ appears to show that under certain conditions as much as two molecules may be burned with one molecule of glucose and no acetone bodies result. The relative efficiency of protein, carbohydrate and the glycerine of the fat in preventing acidosis has been well discussed by Schafer⁸. Plans for the dietetic treatment of diabetes based on the foregoing considerations have been suggested by Woodyatt¹² and by Wilder¹⁰.

Though in certain cases the ratio of fatty acid to total glucose may be markedly different, Woodyatt¹² believes that in the long run a 1:1 molecular ratio is the most satisfactory. Wilder¹⁰ has introduced a chart for calculating a diabetic diet on a basis of 1.7 molecules of fatty acid to 1 molecule of glucose in the food (ketogenic antiketogenic ratio 1.7:1). Both these methods have a definite value in the treatment of diabetes mellitus. Some experience with the 1:1 molecular ratio made it apparent that too high carbohydrate tolerance was required to make it suitable for the majority of diabetics though more palatable diets might be constructed with it. The disadvantage of the Wilder ratio is that a large percentage of patients do not need it, that the ratio of carbohydrate to fat is very low, the choice of foodstuffs is thereby restricted and patients soon become tired of the monotonous diet.

Of course some patients are encountered who will become aglycosuric only when on such a diet as Wilder's. But for the average patient a somewhat less drastic restriction is desirable. Only those who have seen it will appreciate the great difference a few grams of carbohydrate makes to these patients.

While recognizing the usefulness of varying the ratio of fat and total glucose in the diet in certain cases from any arbitrary standard, it seemed desirable to follow a method which would, to some extent, avoid these difficulties. After trial, a molecular ratio of fatty acid to total glucose of 1.3 to 1 was adopted as being more generally suitable. The method to be described has been tried out during the past two years in the Toronto General Hospital. It has proved of particular service in connection with the insulin treatment of diabetes. It is now felt that such patients as are unable to remain aglycosuric and at normal blood sugar levels on this diet should be given insulin in suitable amount to accomplish this object.

TABLE I
Surface Area Chart (Du Bois)

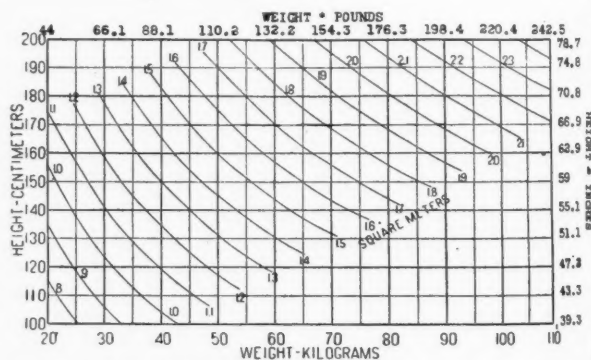


Chart for determining surface area in man in square metres.
Example: Weight 154.3 lb., Height 70.8 in. = 1.88 sq. m.

TABLE II
Caloric Requirement per square metre
of body surface (Aub-Du Bois)

AGE	MALES		FEMALES	
	Cal. per		Cal. per	
Years	Hour	Day	Hour	Day
10-12	51.5	1236	50	1,200
12-14	50	1200	46.5	1,116
14-16	46	1104	43	1,032
16-18	43	1032	40	960
18-20	41	984	38	912
20-30	39.5	948	37	888
30-40	39.5	948	36.5	876
40-50	38.5	924	36	864
50-60	37.5	900	35	840
60-70	36.5	876	34	816

The plan of procedure is to ascertain the normal basal caloric requirement for their age, height, weight and sex, and construct a diet with particular reference to the principles discussed above. The diet is calculated as follows:

(1) The patient is weighed and his height measured.

(2) From Du Bois' Table (Table I) the surface area of the patient is obtained, and this when multiplied by the 24 hr. basal requirement in calories for the patient's age and sex (Table II, Aub and Du Bois) gives the normal basal caloric requirement for a patient at rest.

(3) If the weight is obtained in pounds, inspection of Table I gives the equivalent in kilograms directly, and this latter figure times two-thirds, gives the number of grams of protein required.

(4) The basal caloric requirement (M) divided by 30, minus $\frac{1}{3}$ the protein in grams or, more simply, $C = \frac{M - 10P}{30}$ gives the number of grams of carbohydrate required.

(5) Fat sufficient to make up the calories required is supplied by the formula, $F = \frac{M}{10} - \frac{P}{2}$.

Example: A diet is to be constructed for a man of 55 years, height 5 ft. 7 in., weight 132 lbs. or 60 kgs.

Inspection of Table I shows a surface area of 1.7 sq. m. From Table II: $900 \times 1.7 = 1530$, the number of calories required per day (M).

The protein required $= 60 \times \frac{2}{3} = 40$ gms. per day

The carbohydrate, $C = \frac{1530 - 400}{30} = 37.6$ gm.

Fat $= \frac{1530}{10} - \frac{40}{2} = 133$ gms.

With the composition of the diet in terms of the weight in grams of protein, fat and carbohydrate required it is a comparatively easy matter to construct a suitable diet from food tables*. On such a diet, provided he is kept at rest, the patient in the majority of cases will become sugar free, though this is not usually accomplished as rapidly as in the starvation method. Acetonuria is also controlled but somewhat more slowly than by Allen's method. The advantage of the method consists in the increased comfort of the patient and the fact that, subsequent to getting the patient aglycosuric by the Allen method, a considerable period is required to determine the patient's tolerance. On this account the total period of treatment is actually shorter than the starvation method.

*Reference may be made to Atwater and Bryant—*Bull. 28, U.S. Dept. Agric., The Chemical Composition of American Food Materials*; Joslin—*The Treatment of Diabetes Mellitus*; Locke—*Food Values*; Friedenwald and Ruhrah—*Diet in Health and Disease*; etc.

While the patient is in bed or confined to his room a diet equivalent to his normal basal requirement is sufficient. With greater activity a larger diet is required. Before any such increase is advised it is well to estimate the fasting blood sugar. Values of 0.13% or over would seem to contraindicate such an increase, as patients with high blood sugar ultimately do badly. In most cases with a low blood sugar increase in the number of calories is the first object to be attained, and it is found that the addition of 5 gms. of carbohydrates and 20 gms. of fat, yielding 200 calories is a satisfactory method of increase as it provides a maximal number of calories without inducing ketosis. If this addition is well borne over a period of a week or more, a second and third increase in diet may be allowed, thus raising the food 600 calories above the basal requirement and restoring the patient to something like his old vigour. The ketogenic antiketogenic ratio of these additions to the diet is 1.7:1, somewhat higher than the original ketogenic antiketogenic ratio adopted for getting the patient sugar free but not higher than that based on Wilder's diet formula and quite safe so long as increases are small compared with the basal requirement.

Up to this time no additional protein has been used for three reasons: (1) it increases metabolism by its high specific dynamic action; (2) it is not as efficient an antiketogenic agent as carbohydrate; (3) the need for calories is greater. The diet at this point, though, is becoming somewhat top-heavy with fat and this means lack of variety in the menu. Variety can be provided by increasing the protein at this stage. It is thought that 8 gms. of protein has about the same power to cause hyperglycaemia as 5 gms. of carbohydrate, and consequently this amount of protein plus 10 gms. of fat is added to the diet. The ketogenic antiketogenic ratio is 1.7:1, calories, 122.

At this point a word of caution is worth while. The patient is now receiving 2,252 calories, or 722 calories (40-50%) above his basal requirement—sufficient for the performance of light work. It is the common experience that excessive work or excessive food intake ultimately results in reduction of the patient's tolerance for glucose and it is well to consider whether the increase in diet should not stop at this point. The activities of the patient do not require additional protein and it is believed that further increases in the diet should not be made unless the fasting blood sugar is normal.

The importance of maintaining low blood sugar levels in diabetes has never been overestimated and was never so clearly demonstrated as now. At the present time there is a tendency even under insulin treatment to neglect this important factor in the belief that increased insulin will take care of any further loss of tolerance which may develop. Nothing could be more fallacious. The greater the severity of the case, the nearer it approaches complete diabetes, the greater the difficulty of properly regulating the dosage of insulin and the time of its administration, the greater the number of hypoglycaemic reactions encountered and the oftener the appearance of high blood sugar and glycosuria. In my experience and that of many others, it is unwise, considered from the standpoint of the ultimate result in treatment, to be satisfied with fasting blood sugar levels of more than 0.13%.

The application of the principles of dietetic treatment discussed above may be illustrated by briefly reporting the following two cases:

Case I.—H. G., aet. 32, motorman. Admitted, October 16th, 1922; discharged, December 26th, 1922. Best weight, 156 lbs.; weight at onset, 145 lbs.; weight on admission, 119 lbs. Height, 5' 8 $\frac{3}{4}$ ". Surface area, 1.65 sq.m. Basal caloric requirement, 1,564 calories.

Present Illness.—On May 1st, 1922, complained of headache, dryness of the mouth, thirst and polyuria. On May 15th, sugar was found in the urine. He was placed on starvation treatment. He became sugar free; then was placed on a vegetable diet and gradually other foods were allowed. Has been losing weight, becoming progressively weaker and is now unable to become sugar free on starvation.

Past Illnesses.—Measles at 3 yrs.; whooping cough at 6 yrs.; trench fever, 1916-17.

Family History.—Negative for diabetes and obesity.

Examination.—Well developed, poorly nourished, adult male. Skin and hair dry and harsh. Knee jerks absent and three carious teeth. Otherwise nothing abnormal found in physical examination. On admission he was excreting 50 gms. glucose and 10 gms. acetone bodies.

Treatment.—The patient was required to rest at first. Later the amount of exercise was gradually increased. He was placed on a diet of protein 35 gms., fat 139 gms., carbohydrate 40 gms., calories 1,551. During the first few days of treatment he excreted approximately 30 gms. of glucose and 5-11 gms. of acetone

bodies. By October 25th, the sugar excretion had fallen to 5 gms. and the acetone bodies to 1.25 gms. October 30th, the sugar excreted was 1.7 gms., and acetone bodies, .3 gms. November 2nd, and continuously thereafter, he has been aglycosuric and the Rothera test has shown only the occasional trace of acetone bodies. The blood sugar levels showed gradual improvement—October 17th, 0.227%; 23rd, 0.174%; 27th, 0.190%; 31st, 0.137%; November 3rd, 0.157%; 7th, 0.120%, 14th, 0.130%; 18th, 0.156%; 21st, 0.118%; 24th, 0.143%; 28th, 0.124%. During this time he gained 7 $\frac{1}{4}$ lbs. in weight. After 44 days on the basal maintenance diet, the food intake was increased to protein 35 gms., fat 159 gms., carbo hydrate 45 gms., calories 1,751. The blood sugar continued to remain low, being on December 1st, 0.105%; 6th, 0.110%; 7th, 0.120%; 14th, 0.095%. December 16th, 18 days later, a further addition of 200 calories was made to his diet, raising the intake to 1,951 calories. Two subsequent blood sugar tests showed values of 0.105% and 0.103% respectively, and the patient was discharged on December 26th, having gained 12 $\frac{3}{4}$ lbs. After the first few days in hospital the patient commenced to increase his activities and to ask for work to do. Before he left he declared that he was doing more work than was required of a motorman, and desiring more to do. Patient on March 19th weighed 141 lbs.; had been continuously aglycosuric and felt more than competent to do all the work required of him. His blood sugar was 0.112%. Were it not that he is increasing in weight on his present diet a further raise in diet might safely be allowed but in view of this fact it has been thought advisable to allow as much rest to the pancreas as possible.

Case II.—F. D. H., lawyer, age 52. Height, 5'9". Weight on admission, 137 lbs.; best weight, 195 lbs. Surface area, 1.75 sq.m. Basal caloric requirement, 1,575 calories. Admitted to hospital, December 20th, 1922; discharged, February 12th, 1923.

Present Illness.—Became weak and polyuria developed three years ago. Glycosuria was discovered and he was placed on dietetic treatment. As improvement was not marked he went to a "sanitarium" for several months where he lived on a semi-restricted diet. His general health improved; he felt stronger, put on weight and was sugar free in several morning specimens of urine tested. He probably was not completely aglycosuric throughout the day. After discharge, he gradually lost weight and became dis-

couraged, despondent and "too weak to drag himself around," and reported for treatment.

Past illnesses.—Children's diseases.

Family history.—Negative for diabetes and obesity.

Physical examination.—Revealed no abnormalities except marked loss of weight and muscle tone.

Treatment.—On admission he showed a moderate degree of glycosuria without acetonuria. Blood sugar, 0.195%. He was placed on a basal diet of protein 41 gms., fat 138 gms., carbohydrates 39 gms., calories 1,572. He became sugar free at once, and the blood sugar fell to 0.129%. On January 3rd, weeks two after admission, the blood sugar was 0.116%, and 200 calories were added to the diet in the form of 5 gms. of carbohydrates and 20 gms. of fat. January 13th, the patient had been continuously aglycosuric and the blood sugar was still 0.117%. 10 gms. of carbohydrates and 8 gms. of protein were given to assist in stopping the slight acetonuria which developed. This proved effective. The patient remained sugar free, but the blood sugar rose slightly to 0.122%. In spite of this the diet was raised on January 27th to protein 49 gms., fat 200 gms., carbohydrates 65 gms., calories 2,256. The blood sugar rose to 0.140%. The ratio of ketogenic to antiketogenic substances in this diet is as 1.26:1, a safe level as is shown by only minimal traces of acetone bodies appearing in the urine occasionally. The diet remained the same and the fasting blood sugar level fell to 0.12% on the day of discharge. During the first eight days of treatment the patient lost 5 lbs., but regained this before discharge.

The mental change in this patient was quite remarkable. As he became stronger his despondency disappeared and he became interested in things apart from himself. Within a few days he was demanding more food for his increasing energies. On discharge he was getting a diet of 2,253 calories or 681 calories (43%) above his basal caloric requirement. This provided him with all the energy he required and, in fact, he regained his lost weight on it. He was discharged feeling well and able to take long walks without fatigue.

DISCUSSION

These cases were selected from among a number of patients treated by this diet. The first case illustrates the comparatively slow response to dietetic treatment not uncommonly seen in

these patients. Attention may be drawn to the plan of increasing the diet slowly as the period of relative rest to the pancreas is probably of value in promoting increase in tolerance for glucose. The second patient responded to dietetic treatment more rapidly because of a greater remaining tolerance for total glucose. The diet was increased comparatively slowly and he showed a satisfactory increase in his ability to utilize carbohydrate.

It should not be forgotten that the most satisfactory results are to be obtained when the food taken is digested and absorbed. As pointed out by Woodyatt¹² it is the metabolizing mixture of fats and glucose in the body tissues which determines the presence or absence of ketosis and this is borne out by clinical experience in the treatment of cases given improperly constructed diets in which marked disparity between the glucose and fatty acid obtained. With the damage to the islet tissue of the pancreas there may be, and in severe cases often is, damage to the acinar tissue with deficiency of the external secretion of the pancreas resulting in imperfect digestion of food-stuffs, and a totally different mixture being metabolized than is being fed. This possibility should not be lost sight of in the search for a cause of ketonuria in a case under treatment. In the more severe diabetics a morning ketonuria may be noted which disappears after 10-11 o'clock when the carbohydrate taken at breakfast is being metabolized. This ketonuria is never very serious but serves to remind us of the preferential utilization of carbohydrate over fat when both are available for energy production. It can sometimes be controlled by feeding a portion of the carbohydrate late in the evening. This procedure should be used with caution, however, since increase in the number of meals apparently increases the carbohydrate tolerance and one may be tempted to increase the patient's caloric intake in this way. Many devices such as, increased number of meals, small amounts of carbohydrate given an hour before the meals and active exercise after meals have been employed to increase the carbohydrate tolerance. The improvement is more apparent than real, and is but temporary in nature. They cause a stimulation of the pancreas and more insulin is produced but the increased work injures the pancreas and ultimately lowers the tolerance of the patient for glucose.

When patients have passed through a period of undernutrition due to their disease or their

previous treatment they very readily gain in weight when placed on a suitable diet. The diet here suggested is not actually the basal requirement of the patient but his calculated requirement under normal conditions. In reality, severe diabetics, free from acidosis and on diets low in protein so that the specific dynamic action is low, have basal metabolic rates of 70-90% of the normal; and this explains why patients placed upon such basal caloric diets actually gain in weight when they are relatively inactive. Within limits this increase in weight is desirable but it should not be forgotten that increased weight means increased caloric requirement and increased work for the pancreas. In the more severe cases it is felt that it is advisable to allow them to gain up to within 10-15% of the average weight for their height and age. This is within the normal variation and should provide a measure of protection against infection. The overweight diabetic is advised to reduce in weight as his tolerance will improve by so doing. This may be done by keeping him on a basal maintenance diet and gradually increasing the work he is doing, or by supplying protein and carbohydrate as per formula and limiting the fat. If this is done care must be taken to avoid over-fatigue and should evidence of acidosis develop it should receive prompt attention.

It is well known that diabetics are more subject to infections than other individuals, and these tend to run a more severe, more prolonged course than in other people. The toxic condition induced by the infection causes a loss of tolerance for carbohydrate which may be either temporary or permanent. Much may be done to combat the infection by placing the patient on a suitable diet. Adequate surgical treatment of infections often involves operation and this was formerly attended by a very high mortality in the diabetic. Dietetic treatment of these patients improves the operative risk. It is now felt, however, that most satisfactory results are obtained with an adequate diet containing considerable extra carbohydrate and sufficient insulin to maintain the patient aglycosuric with a normal blood sugar level. Local, spinal or gas oxygen anaesthesia are the preferable methods. Chloroform should never be used as there is grave danger of severe liver damage and coma resulting in diabetic patients unable to store glycogen.

Institutional treatment of diabetes has not received much attention in Canada, partly because of lack of adequate facilities and partly because of the apathetic attitude of some practitioners who vainly imagine that they can get just as good results under home treatment. In all cases it is advisable to institute treatment in a hospital where accurate examinations may be made, where food may be properly selected, cooked and served, where the patient may be trained in dietetics as applied to their disease, the measurement of food, the testing of the urine, etc. There is, of course, no necessity in most cases for a prolonged stay in hospital as a period of three weeks to a month is sufficient to get the patient properly started; he then may be treated as an ambulant case. The additional value to the patient repays the cost many times over and to the physician it often means the difference between satisfaction and disappointment in the treatment of the case.

SUMMARY

The principles underlying the dietetic treatment of diabetes mellitus are discussed. These are equally applicable to the treatment of diabetics with insulin and it is emphasized that without attention to proper dietetic regimes insulin is capable of much harm. For the patient who can live on a properly balanced, adequate diet, insulin is available to protect him from emergencies arising in his disease. Types of diets are discussed and a simple method of calculating a standard diet for diabetics is suggested, together with its application in treatment.

REFERENCES

- (1) ALLEN, F. M.—*Glycosuria and Diabetes*, Harvard University Press, 1913. (2) ALLEN, F. M.—*Numerous papers in the Journal of Metabolic Research*, Vol. I, 1922. (3) ALLEN, F. M.—*Total Dietary Regulation in the Treatment of Diabetes*, Monograph No. II, Rockefeller Institute for Medical Research, 1919. (4) CONROY, M. A.—*Jour. Metabolic Res.*, 2, 367, 1922. (5) JOSLIN, E. P.—*The Treatment of Diabetes Mellitus*, Ed. 2, Lea and Febiger, 1917. (6) MARSH, P. L., NEWBURGH, L. H., and HOLLY, L. E.—*Arch. Int. Med.*, 29, 97, 1922. (7) OPIE, E. L.—*Disease of the Pancreas*, Ed. 2, Lippincott, 1910. (8) SHAFFER, P. A.—*J. Biol. Chem.*, 47, 433, 1921, *ibid*, 47, 449, 1921, *ibid*, 49, 143, 1921, *ibid*, 50, xxvi, 1922. (9) WILDER, R. M., and WINTER, M. W.—*J. Biol. Chem.*, 52, 393, 1922. (10) WILDER, R. M.—*J.A.M.A.*, 78, 1878, 1922. (11) WOODYATT, R. F.—*J.A.M.A.*, 55, 2109, 1910. (12) WOODYATT, R. F.—*Arch. Int. Med.*, 28, 125, 1921.

DIAGNOSTIC NOTES IN OBSTETRICS AND GYNECOLOGY*

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MY purpose to-night is to present to you some diagnostic notes; to formulate a few rules, or maxims, based on my own experience. Many of these are old, and very few of them will be new to you. These rules or maxims have been tried in many an anxious furnace, and in the main they have been found, "not wanting." One's clinical life is really a great interrogation point—a passing from one question to another; and in each and every case, a decision must be reached—the answer, yea or nay, to surgical intervention. Health, and life itself depend upon this answer; it is an anxious business.

The peritoneal cavity is the greatest lymphatic space, and, with its bowel content, it presents the largest absorptive surface in the body, both serous and mucosal. In the female, this cavity is not closed, for the bifid genital tract communicates directly between this cavity and the external surface, the outside world. And this outside world is the contaminated world of the vulva and the perineum. This genital tract, moreover, is subject to many vicissitudes; there are the demands of menstruation and of pregnancy, the various traumata of labour, and it is specially exposed to infection, both venereal and pyogenic. Not for nothing has it been written, "one night with Venus, and three years with Mercury." Or, again, given a woman with a chronic gonorrhoeal salpingitis, in common mercy cast her from a steep place to the sea. The uterus, of all the organs in the body, is the commonest site of neoplasm, and the ovary runs it a close second.

So this lower pole of the abdomen lives a strenuous life, is subject to a varied experience.

I shall now enumerate some general rules or maxims, which I have found reliable, and of great assistance. The following are these maxims:

(1) The most common tumour in the lower abdomen, in the adult woman, is a pregnant uterus. The next most common is the uterine fibroid, and the next, an ovarian cyst. As regards menstruation, the first stops it altogether

(amenorrhoea); the second increases it (menorrhagia); and the third in no way depraves it.

(2) In any pregnancy, actual or presumed, ask, and keep asking, this question: Does the size of the uterus correspond to the period of amenorrhoea?

(3) Make always, and in each and every case, a rectal examination, either directly, or indirectly, from the vagina.

(4) Ever watch the urinary bladder for retention; and especially, after labour, or surgical intervention. "Has the patient passed her water, and in sufficient quantity?" Repeated dribblets may mean mere overflow. Failure to pass water, early in pregnancy, suggests a pressure retention by a gravid uterus that is retroflexed; while such a failure late in the pregnancy may mean a toxic suppression. In any case of doubt, pass a catheter.

(5) The three stages of labour:

The first, most trying to the physician;

The second, most trying to the child;

The third, most trying (critical) to the mother.

Never hurry the first or third stage. Post-partum haemorrhage is more often the fault of the too-impatient physician than of the too-patient uterus. The third stage is a miniature labour. Keep your eye off the clock, for the uterus itself is the only trustworthy timepiece. Let the placenta wait for the recovery of this uterus; its second wind, as evidenced by regular and strong contractions.

(6) If in the hands of an experienced operator, a second operation has not relieved any given condition, further operation is useless.

(7) A pain in the right side does not necessarily mean appendicitis; and when a patient turns easily and readily upon her side, there is no acute lesion in her abdomen.

(8) The acute appendix—its reliable syndrome. (a) Pain first felt in the epigastrium, and later in the right lower quadrant; (b) Nausea, in greater or less degree; (c) Tenderness over the appendix region (McBurney's point) which, be it

*Montreal Medico-Chirurgical Society, March 17th, 1922.

remembered, is at the base of the mesentery; (d) Muscular spasm or rigidity in the right rectus, and oblique muscles. Fever, an increased pulse rate, or a leucocytosis, may be somewhat conspicuous by their absence.

(9) Inspect always the vulvo-vagina, for signs of a gonorrhoeal infection; it is an imperfect world. In the married woman, make always a vaginal examination—a bimanual. Pus in the urethra, pouting tubules of Skene, or the gonorrhoeaica maculae, at the Bartholinian ducts, may furnish the clue to the acute abdominal condition, to even diaphragmatic pain or rigidity. While a uterus, somewhat immobile, "set in starch," where movement of the cervix causes pain, and where one or more tubes are enlarged, sensitive, and fixed, may clinch this diagnosis. With such gonorrhoeal findings, the acute condition is a tubo-peritonitis, often an exacerbation of an old infection.

In such a case it is wise to disregard even the appendix-syndrome, for the chances are strongly against appendicitis. In these acute gonorrhoeal conditions it is a surgical disaster to open the abdomen. Instead, it is good practice to watch and wait, hour by hour, and not day by day.

(10) In the child-bearing period, a sudden seizure of knife-like pain in the lower abdomen, a feeling of faintness, and a slight uterine haemorrhage bespeak a ruptured ectopic pregnancy, and this quite irrespective of the history. The cataclysmic case, with the large haemorrhage, is easy, and he who runs may read. A number of less severe attacks indicate the chronic case, "the leaker" and here one may often neither run nor read. Examine here for the mass lateral to the uterus, and, in doubt, perform an exploratory colpotomy.

(11) The uterine curette—do not abuse it.

(a) Never curette the uterus as a routine; (a routine part of a larger operation).

(b) Never curette the uterus, save it be freely movable, and there be no adnexal disease.

(c) Never curette the septic uterus.

The indications for the use of the curette are best expressed in the words of Clifford Allbutt: "Curette only the 'running' uterus." Like the catarrhal nose it is "running" all the time, only here, it is an alternate white and red discharge. In scientific phrase, this means a sequence of a menorrhagia and a leucorrhoea.

(12) A uterine abortion may be threatened or inevitable. In the presence of three finds, (a) uterine pains, (b) uterine haemorrhage, and (c) a dilated and dilating cervical canal, it is inevitable. This is the clinical trinity, and if only two are present, the abortion is still but threatened.

(13) In a septic uterus there is no place for local treatment. Posture the patient to secure good drainage. If a portion of placenta be suspected, explore the uterus gently with the finger, and if a cotyledon be found, gently detach, and remove it with forceps. Do not curette, or give an intrauterine douche. While fever persists, even a vaginal douche is contraindicated.

(14) In the pernicious vomiting of pregnancy, make the pulse-rate your guide as to interference. If the pulse-rate rise to 100, and continue thereat for twenty-four hours, it is wise to interrupt the pregnancy.

(15) Pain is the greatest liar in our clinical world. Never open the abdomen for pain only. The tongue may lie, the facies never. Among these essential truths that the face enunciates are:

(a) The waxy, pallid face of a concealed haemorrhage;

(b) The ashen face of shock, and

(c) The dusky cyanosis of an acute infection.

We are all agreed that laziness is the one unforgivable clinical sin, and that well-directed, patient, and painstaking observation is the greatest clinical virtue. Clinical wisdom is a matter both of intuition and of experience, and it is always of slow attainment. Intuition is a gift possessed perhaps by the few; but painstaking observation is within the power of any man.

The Antithesis of Urogenital Tuberculosis in a Tabetie Patient.—Victor F. Marshall and Guy

W. Carlson, Appleton, Wis., report a case of tuberculosis of the bladder in a patient affected

with tabes. A search through the files of the Surgeon General's Index Catalogue failed, they say, to disclose a report of a similar case. —*Journal A. M. A.*, June 23, 1923.

SOME ASPECTS OF THE PSYCHONEUROSES*

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IN opening a discussion upon the psychoneuroses, I realize, sadly, how little I have to offer that may be viewed in the light of new thought. It is not, indeed, that there is a dearth of new and brilliant ideas upon this subject nor that these ideas have remained dormant in the minds of their creators for, everywhere, the literature abounds in their expression, but rather because of a fear that, in following the allurements of the unblazed trail, we may miss the main road.

To him, who may have followed this trail far into the intricate windings of the newer Freudian thought, to the inevitable exclusion of broader and perhaps saner considerations, and to the ardent disciple of the doctrine of Babinski, I fully realize how lifeless and commonplace my remarks must appear. And yet, if a consideration of some of the broader principles that underlie the causation of the neuroses, will serve, in any way, to bring renewed zeal to the guidance of this unfortunate element in every society, may not one find one's own justification in dealing with these, alone. The past decade has been marked by great advance in the conception of functional disease but it is to the great war, just passed, that we can attribute the revolutionary conception that has taken place in this domain of medicine. True, many workers long before 1914, were striving to give to functional disease a place in the sun, but it is safe to state that a study of the vast army of psychoneurotics, incident upon the late war, has served to advance the ideas of the general profession by many years. The teaching of medicine in the past and particularly in our own schools, has been essentially materialistic. Any conclusion or conception that lacked the support of the microscope or test tube or was not supported by some time-honoured procedure of examination was conveniently relegated to the discard. Such disabilities or mal-functions as could not be based on some evident organic change in the structural

make-up of the organism, simply did not exist. The result was that the average student of medicine could prepare a passible thesis on the function of the individual organ,—he could discuss at length the myogenic as opposed to the neurogenic theories of the heart action but never realized or learned that either, or both, of these functions were, in any sense, dependent upon emotional or psychic stability. To him vomiting and gastric pain bespoke the presence of stomach ulcer or cancer, in the absence, of course, of the physiological vomiting of pregnancy, little realizing the importance of the psychic in the pathogenesis of such disorders. He becomes a specialist on the various parts of the machine, each of which he views from the necessarily narrow field of the specialist, while the co-ordinated working of the machine as a whole, the constant change in adaptation of that machine to an ever changing environment—in short the psychic control—entirely escaped his field of vision.

When, however, that change of environment became very marked and very sudden; when conditions fluctuated to wide extremes, such as prevailed under war conditions; when the reaction to that sudden change proved inadequate and the machine broke down; when he could no longer accuse any organ or group of organs of inadequacy, he began to focus his attention upon the control and co-ordination of all these organic functions—in short, to study the mental makeup of the organism.

Although war service conditions have materially altered our viewpoint and undoubtedly advanced our ideas as regards the psychoneurosis, we are to-day less concerned with that phase of functional disease than we are with the wide incidence, far too wide, amongst our civilian people.

One hears from time to time that this class of patient belongs essentially to the specialist; on the one hand, to the psychiatrist; on the other to the neurologist, and that no one else has the time or the inclination to bother with them. The truth is that they belong to and come more under

*Read at the Montreal Medico-Chirurgical Society, Feb. 23rd, 1923.

the influence of the general practitioner. He it is who first sees the patient, who knows best his environmental conditions, his constitutional and mental makeup since childhood and who is, above all, best fitted to, and I believe more often does, render the helping hand as the first obstacles in the race of life are encountered. Of course, if these obstacles are too closely placed; if they are too severe, and above all if the runner is constitutionally too ill-conditioned for the race, they soon become institutional cases but until such a stage is reached, and many never reach it, these unfortunates must continue to look for and will, I believe, receive help from, the general practitioner of medicine. It is, then, most unfortunate that almost all the armamentarium for dealing with these cases, must be built up from the physician's personal experience alone.

It is to be deplored that the psychoneuroses receive so little consideration in the curriculum of our present-day medical schools and if one were to seek a reason for such a state I believe the greatest factor in that reason would be found to arise from the wide-spread belief that after all nothing can be done for those people—the student discussing a case of hysteria or neurasthenia is observed to clothe his ignorance of the case in the remarking “nothing can be done,” “there is no treatment”—the nurse in the ward is heard to whisper to her associate, “only a neurasthenic.” And yet there is no group of cases, certainly of the chronic cases, that lends itself more readily to rational treatment or responds more satisfactorily than this very group of cases.

What, then, are the factors which underlie the pathogenesis of the neuroses?

From the days of Charcot, who first seriously considered the neurotic personality, opinion has fluctuated between the organic and the psychic, and even to-day these two fields of thought claim their respective adherents; some stoutly maintaining that the manifestations of the neurotic personality are solely the expression of perverted thought processes; others, that underlying these outward manifestations may be found organic disease processes, were we only able to discover them. The truth will probably be found to fall midway between these two extreme viewpoints. Certainly, we do know that all the symptomatology of the psychoneuroses will follow upon organic disease, while, on the other hand, I think we can just as surely state that many are purely psychogenic in origin.

We must, at the outset, view the situation

from the standpoint of the personality. Given the normal personality, is it possible to acquire a psychoneurosis? The answer must be, yes; and in this concession we admit at once the influence of the environment.

The term, environment, is a broad one and must include all obstacles with which the individual must contend in his endeavour to live to the best of his ability. It must include:

(1) All organic obstacles such as eye strain, focal infections, chronic disease processes, etc.;

(2) Secondly, it includes mode of life, the ever increasing social and business strain that present day life imposes on him who would run the gamut of existence safely and successfully; and more particularly does it include the apparently small but continuous pricks of unsuitable or incompatible marriage.

The man who comes home to dinner and buries his face in the evening paper, nodding consent or the reverse to the apparently futile but, withal, well meant propositions of his spouse, is sowing in her the seed for a future psychoneurosis. The woman who habitually reminds her husband that her neighbour wears better clothes, rides in finer cars and attends nicer clubs is paving the way for a psychoneurosis. When, finally, we have within recent years developed to an alarming extent the neurosis associated with business and occupational existence. Modern social legislation has imposed on the employer of labour, a responsibility which not only the immediate employer but every individual in the social fabric is forced to shoulder. This legislation has aimed to give justice to the employee who has developed organic injury or disease as a result of his employment, and for this reason, is worthy of sympathy and support; but in the field of the psychoneuroses, we find ourselves confronted with a very real evil. In that field, such legislation often presents the necessary stimulus for the production and perpetuation of functional disease.

One is at once struck with the similarity between this group and that of war origin, especially the type of neurosis one finds to-day as a result of war service. In both of these groups we have the necessary conditions for the perpetuation of the symptoms in the form of compensation on the one hand and of pension on the other. It is in this group the traumatic neuroses and the late war neuroses, more descriptively called pension neuroses, that one sees the purely psychic mechanism at its best. No group is more evidently free of organic basis. Here we have in full evi-

dence that type of the neuroses known as hysteria.

Though all authorities are in accord with the opinion that hysteria is purely a mental disorder, that is, psychic in origin, there is considerable disagreement as to the mechanism underlying its manifestations. *Charcot*, the father of special study in hysteria, gives us merely a descriptive conception. He looked upon hysteria as a disease entity but so far as I am aware, offered no mechanistic explanation. *Janet*, first opened up the theory of the subconscious which meant to him, the breaking away or dissociation of a special group of ideas from the main grouping which constitutes the total personality. This meant a narrowing of the field of consciousness. The mechanism by which this smaller group becomes separated was not suggested.

Freud saw in the subconscious, a storehouse of repressed or forgotten experiences which, by reason of their painful affect and consequent inacceptance to the personality as a whole, were relegated to a submental domain, there to work out their own devastating ends. Unfortunately, his colouring of these painful affect complexes was one of sex and sex only, a dogma which cannot withstand withering criticism in the light of our war experience.

And then *Babinski* sees the whole mechanism of hysteria develop upon the basis of suggestion. The bodily defect is in some way or other suggested to the individual and immediately becomes a part of the individual; moreover, such defect produced by suggestion is curable by persuasion,—a form of psychic treatment. If such cure cannot be effected through efficient persuasion, he states the condition is not hysterical, but must either have some organic basis, or be classed as malingering. I fear that even *Babinski* would find difficulty in establishing his diagnoses in these post-war and traumatic cases if he depended upon the result and permanency of his cure, so long as pension or litigation proceedings were in abeyance.

All of these theories are interesting and each, no doubt, has much to commend it while on the other hand, not one of them is of common application. There is, however, one common factor that pervades and characterizes this group of the neuroses and that is the presence of a motive, concealed or apparent, but always directly antagonistic to the higher moral tenets. I am not prepared to say that this motive is always apparent to the hysteric; often, I believe it is not

and as we descend the scale of mental fibre, reaching the level of the submental personality, it is the less liable to be apparent. The mental defective, by reason of his poverty of mental perception and education is less able to present to himself the criticism necessary for its destruction.

In the degree to which this motive is concealed or apparent do we divide our hysterics from our malingerers and here again it is a most difficult decision to make. In any case whether the line be discovered or not, I am convinced that at some period of its existence, this motive rides serenely down the stream of consciousness and there is little to be discerned between the two.

Such, then, are some of the environmental obstacles with which the personality must contend. Every individual meets, and disposes of or succumbs to some or other of these in his course through life. They are common to all. With them the organism must react and the result of that reaction depends not only upon the severity of the obstacle but, also, upon the mental make-up and education of the individual. It resolves into a mental conflict, the solution of which is often the development of a psycho-neurosis.

What, then, of the personality? It has always been a common observation that the harbourer of hysterical manifestations was of inferior mental make-up. He shied at the obstacles and especially so, if he could foresee any temporary advantage by so doing. The fact that he must strain his moral code in order to evade the obstacle meant little to him for after all, his moral sense was not difficult to override and here we note the essential characteristic of the hysteric—a weakened sense of moral. To him, the statement—"I would rather be right than be president" constitutes so many meaningless words. He may be regarded as essentially deficient in moral and aesthetic qualities of character. This moral deficiency, the ground work of the hysterical tendency is shown in figures produced in the U.S. Army selection draft. Of the soldiers who manifested some hysterical defect prior to enlistment, over seventy-five per cent. were of neuropathic heredity, while of those showing hysterical defects for the first time during service, over fifty per cent. were of neuropathic heredity.

It is evident that we are dealing with an organism, primarily weakened by reason of neuropathic constitution, which can but illy serve the organism in its conflict with the obstacles of life. In such an organism the conflict is short, the

moral support is small and the ever present instinct of self-preservation, lacking the control of education and sound moral sense, assumes the superior position. The easier way is the development of a neurosis which now becomes the only means of defense.

We can then regard the psychoneurosis as an adaptative reaction of the neuropathic nervous system. It is a defensive and protective mechanism which springs into activity just so soon as the organism becomes endangered. It is the automatic defense of the nervous system which enables the individual to side-step the present difficulty and to permit of his remaining in the race, under easier and less harassing conditions. Society, to-day places upon the mentally and physically strong a heavy burden. Their handicap would appear to be overwhelming, while on the neuropathic individual the load is reduced to a minimum. Everywhere we find societies and real or fancied benefactors ready to open the gate to the easier way. The course is levelled off, obstacles removed and in many cases carriages provided so that no effort is necessary on the part of the weaker brother. Why not then accept what is offered so long as it can be done within the bounds of decency and self respect, be that quality ever so small. Moreover, if he travels in the garb of disease, he is provided with a passport that places him beyond reproach. And so, born out of and upon the primary instinct of self-preservation which demands that the organism must exist, we find developed as a biological necessity a means of protection for the weaker organism. He is unable or unwilling to face the problem that confronts him and, in the shelter of a neurosis, he is carried over the difficulty while, at the same time, he is saved from the destructive sensation of absolute defeat. It is a compromise, the best at hand, and arises out of the biological needs of the organism.

So much for the hysteric, but what about the individual who presents the typical picture of a fatigue neurosis—true neurasthenia? Here the picture is one of bodily inefficiency. The patient is often thin and pale, he becomes fatigued on the slightest exertion, the respiratory rate advances, the pulse is rapid, he shows some cyanosis and often the onset of dyspnoea renders activity of the mildest grade, impossible.

Can we apply the same principle of a defense reaction in these cases? The natural defense of the organism against fatigue is rest, and in the

ordinary happenings of life there is sufficient rest to permit of the repair of the ill-effects of fatigue. The normal individual finds ample time for the neutralization of the effects of his mental and physical effort. Now let us suppose the intervention of another element, the wish to evade obstacles and to run the race with as little discomfort as possible and especially the desire to gain a satisfaction, otherwise impossible, and we have built up all the mechanism necessary for neurasthenia. It is a state of chronic fatigue. The individual realizing the subjective sensations that accompany the fatigue state, learns to anticipate these sensations and too readily prepares for their acceptance. This state of mind plays the part of a break upon effort until, finally, that stage is reached where effort and the fatigue sense becomes indistinguishable. He is the victim of a fatigue neurosis—neurasthenia.

Here, too, we can discern the defense mechanism brought into play in order to prevent the ultimate end of complete dissolution. In this type of neurosis we come nearer to the physiological level of activity, as opposed to the psychological. It constitutes the nearest approach to the organic, and in the later stages, when the defense reaction is well established, springing to the forefront on the slightest stimulus, it is doubtful if we are not dealing with a state of organic incapacity. This is the type, too, that develops as a result of pre-existing disease of definite organic cause and may be regarded as a biological necessity in the convalescence of such disease processes, as tuberculosis and other septic diseases.

It is probably somewhat premature to open a discussion on the rôle played by the endocrine system in the maintenance of the neurasthenic state. That they occupy a place of essential importance in our consideration of this subject, is beyond doubt, but until more is known of the internal secretions in general and the adrenal in particular, no very definite stand can be taken. Any consideration of the endocrine glands must embody a study of that, hitherto, uncharted domain of the sympathetic nervous system. The close relation between the sympathetic system and the activity of the internal secretory apparatus, especially the adrenal medulla, is evidenced in all recent study on this subject. Workers like Cannon, Elliott and Langdon Brown have proved, I think, beyond doubt, that the secretory output of the adrenal medulla is directly coupled up with activation of the splanchnic nerve, while Cannon has carried his observation farther and

shown that activation of the splanchnic is directly controlled by the emotions, particularly the emotion of fear. This, then, gives us a working hypothesis which, beginning with the end organs—the secretory glands—carries us back through the ramifications of the sympathetic nervous system, finally to arrive at the source or generator of all such activity—the emotions.

I do not wish to take up your time with any detailed report of this work, for in any case, as Timmie states, much of it is, as yet, controversial and not a little without sufficient foundation. Yet, I simply wish to draw attention to the fact that the emotion of fear—the concomitant of the instinct of self-preservation, may, in the light of present knowledge, be regarded as the dynamo of that wonderful and fascinating system, the greater understanding of which, will, I believe, open the door to a sounder knowledge of all these abnormal conditions that constitute the neurasthenic state.

What, now, of the treatment of these cases? Can, after all, anything be done to make life easier for this class of patient? If so, from what side should we attack the problem? We believe that it is all a question of conflict between the personality and life's obstacles. Are we then to attack the problem on the side of the personality or attempt to level off the bunkers in life's course? Personally I think we have been doing too much levelling, endeavouring to make the course too easy and paying not enough attention to bolstering up the personality. The mediocre golfer who knows his own little 9-hole course can, if he stays there, make a fair showing and cover the course with a fair degree of satisfaction. He knows all the bunkers and from experience, I might say habit, contrives to utilize the ground to fair advantage. Now put him on a new championship course and he is lost. He learns for the first time, maybe, that he has never mastered the essential of the game,—the swing. He finds trouble everywhere, is continually in the bunkers and finally, becoming thoroughly discouraged, writes himself down a failure. Now put this player under a competent professional, re-educate him in the essential of golf and if he is not a confirmed dub, he will soon learn to smile at the trouble. He will have found himself. If he is not a confirmed dub?—yes, that is the question we must first settle in dealing with these cases. Is the patient capable of attaining and holding any level of efficiency? Is

he mentally deficient? If so, and this deficiency is at all marked, we may as well save our energy. He is a derelict and must be carried through life on the backs of a willing and sympathetic public. Our field of endeavour must lie with the normal or slightly subnormal individual who has encountered the more severe obstacles and failed. Even here, let us first of all be sure of our diagnosis. One case of mistaken diagnosis often dampens the ardour of the physician to such a degree that he shies at any future attempt. He may then join the ranks of those who believe that all functional disease is the outward expression of some hidden organic process. It may really be that at the root of all the trouble in any one case, lies a dormant septic focus, and it is but rational to first eliminate the possibility of focal disease.

Let us not, however, carry this conviction too far; the present day campaign carried on against teeth, tonsils, rectal atonia, etc., has been provocative of a great deal of unnecessary, harmful and expensive operative indulgence. The old grudge that so many practitioners held against the uterus and cervix is fading but slowly. Just how a variation in the geometrical relation of the uterus to the pelvic cavity, can produce or influence the mental state, is difficult of explanation; and yet, the tendency to pick upon and ruthlessly assault the uterus or ovaries, is amazing.

You who are familiar with the writings of the ardent disciples of focal infection, must wonder why any neurotics remain and why we any longer, require institutions for the care of such cases. Let us be generous and put it down to over-zeal, which is not to be ridiculed; but always let us be honest and, sometimes, let us exhibit the elements of common-sense. At this point we may consider some of the so-called cures in hysteria. The apparent disability in these cases is one of somatic disturbance—a localized paralysis or anaesthesia, a contracture or bent-back, an aphonia or hysterical blindness—that is, the mental conflict has been converted or exteriorized into a bodily defect—the so-named conversion hysteria.

One has only to scrutinize war literature to learn of the multitudinous methods of cure, employed in these cases, and note that the cure is always directed toward clearing up the conversion defect. Each worker extols his own particular method, whether it be massage, graduated exercise, hypnotism or painful fara-

dism and all are equally successful so far as they go. There is, however, a noticeable avoidance of the real seat of the disease; the clearing up of a somatic defect in these cases is no more an eradication of the real disorder than the extinguishing of a fire in the front porch, while the furnace has blown up in the cellar. There is nothing easier in the whole realm of therapy.

The universal application of splints, jackets and supports is one of the surest ways of firmly establishing the reality of his trouble, in the mind of the patient.

Then, again, fictitious operations and methods involving trickery, are to be deprecated. They can carry no real therapeutic value if we consider at all the future of the patient. These methods no doubt were of value in the army and fulfilled a very real purpose, where we were concerned with the immediate repair of the patient, in order that he might be of some further, though necessarily depreciated use to the forces. In civilian life we must think of the patient's future and so must go direct to the source of the trouble.

I believe that no lasting harm is ever done by being frank and honest with the psychoneurotic. Tell him, tactfully of course, where his trouble arises, disregard whenever possible the little pains and discomforts which to him are so vital, and pay as little attention to his outward manifestation as possible. Explain in simple and understandable terms the mechanism of the conflict and appeal always to whatever moral sense he may possess.

It is with this moral quality that one must work. It is unnecessary to repeat that one must have and hold the confidence of the patient. The rest is education and we cannot expect to bring about any lasting change, unless time is spent in this process. This is the method of education and

persuasion and is to my mind the only rational and efficient method of therapy in these cases.

Time will not permit of detail and after all the avenues of approach vary in individual cases. Suffice it to say, that if one keeps in mind the mechanism of the process and believes only in the re-education and strengthening of the patient's morals, one is on much surer ground than if he has recourse to temporary and superficial methods of suggestion. Let

Let me quote the following excellent words from Dubois.—“It is in their own education that patients ought to seek their cure and that people in good health should find their safeguard against nervousness. To find inner happiness and health he must turn his attention away from himself and interest himself in others. Altruism must take the place of natural egoism.”

“Those whose reflections lead them inevitably to free thought will find in themselves, in a stoicism stripped of all egoism, the strength to resist all that life brings to us”.

“Those to whom the nature of their minds still permits a childlike faith will find strength in their religious convictions, in proportion as they are living and sincere”.

“Unfortunate are they who are indifferent, who seek nothing but the satisfaction of their material desires.

“It is dangerous to go through life without either religion or philosophy. I am tempted, without casting any reflection on believers, to say, more simply, “without philosophy” for religion itself can be efficacious only so far as it succeeds in bestowing upon the individual who believes a philosophy of life”.

“Let one display the legend ‘Master of myself’ and patients will follow it to victory”.

Intracutaneous Reactions in Pertussis.—

Thomas G. Hull and Ralph W. Nauss, Springfield, Ill., used nine different preparations of pertussis vaccine, and 341 injections were made intracutaneously. The work was done at an institution where an epidemic of whooping cough was developing. The ages of the children tested in most instances were from 8 to 12 years. The results of the investigations recorded do not indicate that preparations of

pertussis bacilli can be used intracutaneously to diagnose whooping cough. Freshly prepared suspensions, suspensions 3 years old, suspensions killed by heat and suspensions killed by chemicals gave results that were conflicting. Nearly all children, whatever their ailments, gave positive reactions. Whooping cough patients at times gave negative reactions, however.—*Journal A. M. A.*, June 23, 1923.

THE USE OF THE WASSERMANN REACTION IN THE DIAGNOSIS OF SYPHILIS

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TO many medical men the result of a Wassermann test is the final, absolute criterion as to the presence or absence of syphilis in the patient under observation. A brief consideration of the theory that has been evolved to explain the reaction is conclusive evidence that such an attitude of mind is fallacious and productive of great harm to the patient. Were the Wassermann test a true complement fixation reaction, *i.e.*, were the substances tested for antibodies produced by the presence of the specific antigen, the *treponema pallidum* in the body, such a view would be correct but not only is the antigen non-specific, (not an emulsion of the organisms) but the substance, whose presence gives a positive reaction, is not a true antibody but a lipid globulin, known theoretically as reagin, and is the result of the breaking down of certain tissues in the body. The production of reagin is most commonly the result of infection by various spirochaetes, of which the spirochaete of syphilis is the only one found in temperate zones, but its production may occur in late tuberculosis, malignancy and occasionally in pregnancy. However, in this country, if the above mentioned easily diagnosed conditions are excluded, a positive Wassermann reaction usually means that the patient is suffering from syphilis, but as the presence of reagin depends on the activity of the infection, a negative reaction is of much less value in excluding the presence of the disease.

Believing that the Wassermann test is one of the most valuable diagnostic signs of syphilis, if properly interpreted, it is thought well to enumerate some of the errors that may result from a too slavish acceptance of its results and to outline a basic scheme by which the reaction may be used as a scientific diagnostic procedure. This can best be done by considering it in relation to each stage of the development of syphilis.

The use of the Wassermann Reaction in the Diagnosis of Primary Syphilis.

Although the primary lesion of syphilis occurs at the point of inoculation, it is but the outward

manifestation of a systemic infection, for, by the time it appears, the organisms have invaded every tissue in the body. Tissue destruction of such a degree as to produce sufficient reagin to be detected by the Wassermann test on the blood, has not yet occurred, so that throughout the primary stage the Wassermann reaction is negative. In fact on this point depends the diagnosis of the stage of the disease, for primary syphilis may be defined as that period elapsing between the first appearance of clinical signs, (the chancre) and the appearance of a positive reaction in the blood. As a consequence the Wassermann reaction is useless for the diagnosis of syphilis during this stage and this is the more unfortunate because the primary period is the time *par excellence* when treatment should be commenced, for proper treatment started at this stage will give an absolute cure. This becomes increasingly difficult as the blood becomes positive.

The diagnosis of primary syphilis depends on the demonstration with the dark-field apparatus of the causative organism in the secretions from the lesion and from the satellite glands, and no matter how unsuspecting a genital sore may appear, it is a safe rule to regard all such lesions as syphilitic until repeated examinations fail to show the presence of the *treponema pallidum*. A genital sore should receive no local treatment whatsoever for ointments, wet dressings, or cauterization destroy the spirochaetes that swarm on the surface and render their demonstration impossible. Should the general practitioner be unable to find the organism or should a dark-field apparatus be unavailable it is advisable to refer the patient to one of the provincial laboratories or to a specialist for diagnosis, as the risk of allowing a case of syphilis to become generalized is too serious to warrant any lack of care.

The Use of Wassermann Reaction in the Diagnosis of Generalized (Secondary) Syphilis.

The stage of generalization is that period beginning a few weeks after the appearance

the primary lesion and lasting an indefinite time, usually several months. This stage is characterized clinically by the host of secondary lesions, such as skin eruptions, mucous membrane ulcerations, and signs of mild ocular, auditory, visceral, osseous and central nervous system involvement. The picture presented by a case of generalized syphilis denotes a very active proliferation and a widespread dissemination of the infecting organisms, with consequent tissue reaction and an abundant formation of reagin, so that it is to be expected that the blood Wassermann reaction will be nearly always positive. This is found to be so in from ninety per cent. to ninety-five per cent. of cases during this stage, and it is during this time that the reaction attains its greatest reliability as a means of diagnosis. Unfortunately, its value is only corroborative for it is usually associated with such marked clinical signs as make the diagnosis certain without recourse to laboratory tests. Those cases that do not present a positive Wassermann reaction are frequently of a malignant type, and the question of diagnosis may easily be determined from the symptoms.

The Use of the Wassermann Reaction in the Diagnosis of Latent Syphilis.

With the subsidence of the signs of generalization a period of clinical latency commences, which may last from a few months to many years, before the symptoms of late (tertiary) or neurosyphilis manifest themselves. During this lapse of time the disease is not inactive but is laying the foundation for those destructive lesions that characterize late syphilis of the various organs.

Owing to the inadequacy of clinical methods to detect pathological changes during this period of latency, the Wassermann reaction is here the most valuable diagnostic symptom. A patient presenting himself for examination for syphilis and who shows no signs of active disease falls into one of four classes.

Class 1.—If there is a definite history of syphilis and the blood Wassermann reaction is repeatedly positive he should be treated as a case of latent syphilis. (It must be insisted that in latent syphilis, where clinical symptoms as an aid to diagnosis are absent, one Wassermann reaction is valueless. Several specimens from this type of case should be taken at different times and submitted to several laboratories to eliminate any

possibility of technical error. All of these cases call for an examination of the cerebro-spinal fluid before a positive diagnosis is made. If the fluid is negative they belong to the variety of case here considered; if positive they are to be considered cases of neurosyphilis).

Class 2.—If there is a definite history of untreated syphilis and the blood Wassermann reaction is repeatedly negative it is advisable to administer to the patient one injection of arsphenamine, and take a specimen of blood for a Wassermann daily for the next seven days. If these are all negative the chances are that no syphilis is present, but the patient should be examined at least every six months for several years. If these bloods are positive, treatment similar to Class 1 should be given.

Class 3.—If there is a suspicious history of untreated syphilis and the blood Wassermann reaction is persistently negative the same procedure as for Class 2 is adopted, except that there need be no observation period following the negative results of the provocative injection.

Class 4.—If there is no history of syphilis and the Wassermann reaction is persistently strongly positive from different laboratories, and the spinal fluid is negative the question of the age of the patient is the important consideration. If under fifty years he should be treated for syphilis. If over fifty years of age, providing he shows no clinical signs of a chronic disease process that might be attributed to syphilis, the patient should be kept under observation for the remainder of his life and only treated if clinical signs appear, for if the age of fifty years has been attained without syphilis manifesting itself clinically, it is improbable that the disease will shorten the patient's normal longevity materially and it is, therefore, unwise to subject him to intensive treatment.

It should be mentioned that in this and the succeeding class of cases, a weakly positive or doubtful Wassermann reaction should be considered as negative, unless persistently present.

The Use of the Wassermann Reaction in the Diagnosis of Late (Tertiary) Syphilis.

Following the period of latency, untreated or inadequately treated cases develop signs of late syphilis, severe destructive lesions of any or all of the tissues. The pathological condition is the same whether the nervous system or the other parts of the body are affected, but owing

to the highly specialized character of the central nervous system, it is felt advisable to consider late syphilis as two separate entities, *i.e.*, late syphilis of the general body tissues and neurosyphilis.

The diagnosis of tertiary syphilis is important for the general practitioner as it supplies the etiological factor for many serious conditions, particularly diseases of the viscera and the identification of the causative factor and the institution of proper treatment may mean the difference between life and death to the patient. In late syphilis there is not the intense spirochaetæmia of the generalized stage but the tissues are sensitized to the action of the organisms so that a fewer number provoke a more destructive reaction in the host. The amount of reagin formed is small and, as a consequence the Wassermann reaction is positive only in a minority of cases.

In late syphilis, a persistently positive reaction means syphilis whether typical clinical findings are present or not but a negative reaction is valueless in excluding the disease. If a case shows definite lesions of late syphilis and a negative blood Wassermann reaction and spinal fluid it should be treated for late syphilis. If a case presents a condition whose etiology is obscure and the blood Wassermann reaction and the spinal fluid are negative, it may be necessary to have recourse to the therapeutic test in order to make a diagnosis. The usual plan is to administer to the patient two injections of arsphenamine at a week's interval. After the first the condition, if syphilitic, may be aggravated, but within a week after the second injection a syphilitic lesion will show such marked symptomatic improvement that there will be no doubt as to the diagnosis. During the week following the first injection, blood specimens should be taken daily to see if a provoked Wassermann reaction occurs. If not, it does not affect the diagnosis made by clinical improvement by treatment. Certain nonsyphilitic skin lesions improve under the therapeutic test but such doubtful cases are rare and when seen should be referred to a dermatologist for diagnosis.

The Use of the Wassermann Reaction in the Diagnosis of Neurosyphilis.

As mentioned before, neurosyphilis is but late syphilis attacking the central nervous system and it should be remembered that the patient

with neurosyphilis requires treatment for his general systemic infection as well as for his neuro-involvement. The diagnosis of neurosyphilis depends on finding a positive cerebrospinal fluid, for early cases may be asymptomatic or clinically atypical, and the blood Wassermann reaction may be negative. Too great emphasis cannot be placed on the importance of an examination of the cerebrospinal fluid in every case of syphilis and in every case showing signs of disease of the nervous system, for only by this method can the presence or absence of neurosyphilis be determined. The operation of lumbar puncture, if properly performed, is simple, almost painless and devoid of any ill after-effects, and the information obtained by it invaluable.

The Use of the Wassermann Reaction in the Diagnosis of Congenital Syphilis.

The diagnosis of congenital syphilis depends on much the same factors as it does in the acquired disease, except that the primary stage is absent. If the case presents definite clinical signs, it is unimportant whether the Wassermann reaction is positive or negative. If clinical signs are absent at the time of examination and the blood Wassermann reaction repeatedly strongly positive, the patient has syphilis. If clinical signs are doubtful and both the blood and cerebrospinal fluid are negative, the blood and spinal fluid of the parents and other children should be examined, and if found positive, and the history is such as to support the supposition that the infection with syphilis antedated the conception of the child, the case should be considered one of syphilis. In case the foregoing is not possible, recourse must be had to the therapeutic test with two intravenous injections of arsphenamine. Fortunately, if the child's blood is examined after the first month, for up till then a negative reaction may be obtained even in the presence of syphilis, the reaction in a congenitally syphilitic patient is usually positive.

The Use of the Wassermann Reaction in the Diagnosis of Syphilis in a Pregnant Woman.

In the absence of a positive history or clinical signs, the Wassermann reaction is a useful diagnostic measure during the early months of pregnancy, in order that antenatal treatment may be commenced early enough to ensure the birth of a living non-syphilitic child. In the later months

of pregnancy the reaction loses its specificity for the formation of large amounts of lipid globulin in the blood of a pregnant woman sometimes causes false positives or negatives. Consequently whatever the result reported on the blood of a woman during the later months of pregnancy, the finding should be substantiated by another test made a week or so after confinement.

To sum up, the Wassermann reaction if properly interpreted, is one of our most useful diagnostic measures to determine the presence of syphilis in a patient, but it should be remembered that it is only a symptom and may be absent even in the presence of syphilis. In interpreting reports, the following should be borne in mind:

(1) The Wassermann reaction is negative during the primary stage, and cannot be used as a diagnostic measure at this period. This is of great importance because syphilis is more amenable to cure with proper treatment during this stage than at any other period of its life cycle and to wait for a positive blood Wassermann reaction may place the patient among the incurably diseased.

(2) The Wassermann reaction is usually positive during the stage of generalization. In those

cases that show a negative blood, the clinical symptoms are usually so definite that there is little difficulty in making a diagnosis.

(3) During the stage of latency a repeatedly positive Wassermann means syphilis, but a negative one, in the presence of a positive history does not exclude the disease.

(4) Late syphilis not uncommonly shows a negative Wassermann reaction, but the use of a provocative injection of arsphenamine, the clinical picture, or the results of a therapeutic test, usually suffice to clear up the diagnosis.

(5) The diagnosis of neurosyphilis depends on the finding of a positive reaction in the cerebrospinal fluid; examination of the blood alone cannot be relied on.

(6) Congenital syphilis usually shows a positive blood Wassermann after the first month, but in suspicious cases where the blood is negative, recourse must be had to the same procedures as for late syphilis *plus* the examination of the blood and spinal fluid of the father and mother.

(7) During the first half of pregnancy, a positive blood reaction usually means syphilis, but during the second half false negatives or false positives may occur necessitating post-partum re-examination.

PELLAGRA IN ONTARIO WITH REPORT OF TWO CASES

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PELLAGRA was first reported in this province in 1914, by Forster and McVicar¹ who described two cases occurring at the Ontario Hospital, Toronto. Their article included a comprehensive discussion of the etiology and was illuminated by coloured photographs of their patients. Both of these patients died in August, 1913, and they are the first deaths from pellagra in Ontario as shown by the Registrar-General's Report. At the same time, Vrooman² reported a case in Brockville, which recovered and remained well for four or five years when it was lost sight of. In 1916, McClennahan³ and Rolph⁴ each reported a case.

That these are not the only cases that have

occurred, however, is shown by a study of the Reports of the Registrar-General for Ontario. From 1913 to 1922, inclusive, thirty deaths from pellagra are recorded. The lowest number occurred in 1922, when no deaths were reported, and the highest in 1919, with five deaths.

I could find no information regarding two of these, but of the remaining twenty-eight, twenty-one were women and seven were men, and all but six were between the ages of forty and sixty years. No cases occurred among children, as contrasted with conditions in the Southern States where children are frequently affected. Sixteen of the patients were born in Canada.

Most authorities state the mortality rate for

this disease is from twenty-five to fifty per cent. If these figures are applicable in Ontario, it would appear that during this time there must have been approximately sixty to one hundred and twenty cases of pellagra in the province. This seems an insignificant number, but it is probably an underestimation, as symptoms may often be of a mild character and pass unrecognized.

The following two cases were observed at the Ontario Hospital, London, the first occurring in a woman who had been psychotic for sixteen years and the second developing a psychosis as one of the symptoms of pellagra. The diagnosis depends on what Knowles has called the three d's,—dermatitis, diarrhoea and delirium, all of rather a specific character, as indicated in the case reports.

CASE 1

L. M. C., 45, female, single, Canadian. Admitted 6 June, 1922. Two previous admissions in 1905 and 1909, making considerable improvement and being discharged one to three years later, respectively.

Previous History.—Good progress at school, no severe illnesses; lived at home until admission here, taking considerable interest in church activities and helped with the sick in her community.

Family History.—Not important.

History of the Psychosis.—Mental conditions similar on all three admissions. Alert, talkative, pompous, irritable, complaining, with changeable delusions of a grandiose and persecutory nature, claiming to be related to royalty, was going to sue the County of Kent for \$15,000,000 and was going to build a wonderful hospital with this money and cure all cases of mental disease. Thought the nurses poured ether in her bed, tasted drugs in the food and at times refrained from eating for fear of being poisoned. Always finicky about her food. These symptoms continued without obvious deterioration until her death on July 11th, 1921.

Physical Condition during her several admissions revealed nothing of interest. She was thin; palate high; ear lobules adherent; many teeth absent; heart sounds distant and irregular, but no disease demonstrable; arteries not palpable; lungs normal; abdominal contents normal.

Attack of Pellagra.—On June 24th, 1921, patient attended a garden party on the hospital grounds, the day being warm and sunny. The next day her hands and arms were quite red on

the dorsal surface extending to a line about midway between wrists and elbows. The anterior surface of each wrist was similarly affected except in the midline. The condition was considered to be due to sunburn and boric compresses were applied. A few days later a dusky redness appeared about the inner canthus of the right eye, becoming more extensive each day. Similar patches appeared on the forehead in irregular formation. About the same time she began to have several large, loose bowel movements daily.

Patient developed a pronounced asthenia and her mental state was one of confusion, disorientation and mild delirium. Marked twitching and tremours were generally distributed. Erythema on hands and arms did not alter materially until about ten days after its first appearance, when it became dull red and a few days later began to desquamate. Diarrhoea did not respond to treatment. Wassermann was 3 *plus*.

Symptoms became progressively worse and patient died on July 11th, 1921. An autopsy was not obtained.

Preliminary symptoms, which did not direct attention to the diagnosis made later, began in October, 1920, when the patient was noted to be weak and suffering from diarrhoea. In December, 1920, patient lost considerable weight and complained of diarrhoea and vomiting, but her statements could not be corroborated. She was given large doses of castor oil daily for several days and improved, and our notes at that time state, "her illness was probably due to auto-intoxication from being habitually constipated." In March, 1921, diarrhoea and weakness again appeared, for which no cause was found and she was given a tonic and special diet and showed some improvement, but diarrhoea continued intermittently until the acute onset following the garden party.

There was no history of previous attacks, although spells of vomiting and diarrhoea were reported in 1913. In January, 1918, patient had an erythematous condition on the forehead which was diagnosed as erysipelas. Eyes were closed by the oedema; the temperature reached 104°F. Patient was ill about one month. There was no rash on the hands, or diarrhoea at that time, and the diagnosis as made was probably correct although in the light of subsequent developments the erythema was at first thought to have some significance.

CASE 2

G. T., 36, female, married, Scotch. Admitted 12th March, 1923.

Previous History.—Had always lived in Scotland until five weeks prior to admission, chiefly in Edinburgh. But little education, married at 26, one child; husband a labourer, always in poor circumstances. No previous illness of note; but she was always nervous. A nervous illness in the spring of 1922, but little information available. Immigrated to Canada five weeks prior to admission, arriving in Chatham about two weeks later.

Family History.—Not important.

Attack of Pellagra.—For six or eight months nervous and weak. Would twitch while sleeping. Was not ill during the voyage but was quite exhausted on arriving at destination. One week later complained of "queer" sensations in legs; was nervous and sleepless for another week, when mental symptoms were first noted, patient stating that a miracle had happened as the result of something bursting in her head. Confusion developed, patient imagining she was on the boat again, that the boat was sinking; could see the fishes, mistook relatives for others in Scotland; difficult to keep in bed, screaming and struggling at times in spite of marked asthenia. Diarrhoea commenced two days after onset of mental symptoms, stools being large, loose, foul-smelling. Three days later the dorsal surface of hands and wrists were noticed to be quite red, but relatives attributed this redness to gripping her hands for purposes of restraint, but were alarmed that it persisted for about forty-eight hours. She was admitted to the Ontario Hospital, London, on the next day, the 12th of March, 1923.

On admission was extremely weak, slight impairment of resonance over the right lung, but no râles. Soft mitral systolic murmur: rate 110. Abdominal muscles held rigid, but no tender points. Ptosis of left upper eye-lid. Speech tremulous and general tremulous condition of lips, tongue and fingers. Deep reflexes all exaggerated; ankle clonus present. Babinski negative. Dorsal surface of fingers and hands and palmar surface of both wrists were rough, brown and dry but no erythema noted such as described by relatives. This abnormal skin condition ended abruptly and irregularly about the level of the distal ends of the radius and ulna, the line of demarcation being quite distinct on both surfaces. The tongue was also large, red

and glossy. Blood pressure, systolic 115, diastolic, 75. Red cells, 5,040,000, white cells, 16,400, haemoglobin, 70%, temperature, 99°-101°F. Condition was one of mild delirium; she was disoriented, showed considerable clouding, but could understand simple questions and reply by a gesture of the head. Conversation was limited, tremulous and rambling. At times tried to get out of bed without apparent reason. Repeatedly soiled the bed without appreciating the fact that she had done so.

Symptoms gradually increased in severity. Diarrhoea could not be checked, six to ten movements being passed daily, particularly pungent and foul-smelling. Five days after admission, a red patch about one and one-half inches in diameter appeared on the right side of the forehead, just below the hair line, which persisted. Nervous irritability became more marked, temperature higher (105°F.), asthenia more severe with development of coma. Desquamation on the hands was noticed for forty-eight hours before her death on the 25th March, 1923. Autopsy failed to discover any gross or microscopic lesion in the brain or other systems.

Discussion

A study of our cases reveals no definite etiology. Case No. 1 had had a dietetic error for many years due to her delusions about poison in the food, but so far as can be learned, no one element in the food was constantly absent. It is noteworthy, however, that temporary improvement followed purging and placing her on a more satisfactory diet. She finally died, however, in spite of this. Goldberger's⁶ investigations indicate that pellagra is due to a protein deficiency and his rather sensational claims as to prevention and cure of this disease by the proper feeding of proteins would appear to make his theory almost conclusive, but he does not give a satisfactory explanation of the high mortality rate which continues in spite of adequate diet, nor does he explain why the disease is so common in middle-aged persons, who presumably have always lived on the same diet and in whom symptoms might have been expected earlier, nor does he explain the tendency to epidemics. Enright⁷ reports a number of cases arising among German prisoners of war in Egypt in spite of an adequate diet.

Case No. 1 showed a positive Wassermann reaction in the blood shortly before her death

although the test was negative a few years previously. There was no history of syphilis. Has this any significance?

Case No. 2 had had no known dietetic insufficiency although had always lived in rather meagre circumstances. An interesting point in her case is the definite leukocytosis which Hillman⁸ reports is quite common in cases of pellagra.

Jobbling and Arnold⁹ and others have reported finding a mould, the *aspergillus glaucus repens* in the stools of many of their cases. The former investigators attribute the symptoms of pellagra to the activities of this organism acting in a high carbohydrate medium producing a photodynamic toxin and their experiments are interesting and tend to bear out their theory. They believe the improvement in many cases following the administration of sufficient protein is due to the inhibiting action of proteins on the growth and toxin production of the *aspergillus* rather than to a simple correction of diet. With this idea in mind specimens of stool from Case No. 2 were cultivated on the special media described by them according to their technique but the fungus was not demonstrated.

The older theory that corn products either good or diseased caused pellagra has been largely discredited for surely this disease would be much

more common in more northern latitudes, for many people eat corn products to a considerable extent and yet pellagra is comparatively rare except in semi-tropical localities. Nevertheless Lustig¹⁰ reports that the Official Italian Commission on the cause of pellagra has concluded that in Italy corn is the essential cause, possibly effective by reason of low protein and vitamin content in the corn diet of the peasants.

The etiology is, therefore, still uncertain but the work of recent investigators discussed in this article brings the solution perceptibly nearer.

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REFERENCES

- (1) FORSTER, J. M., and McVICAR, C. S.—*Bull. Ontario Hospitals for Insane*, 7:65 (Jan.), 1914. (2) VROOMAN, F. S.—*Bull. Ontario Hospitals for Insane*, 7:80 (Jan.), 1914. (3) MCCLENNAHAN, C. A.—*Bull. Ontario Hospitals for Insane*, 9:20 (July), 1916. (4) ROLPH, A. H.—*Canad. Med. Jour.*, 6:323 (April), 1916. (5) *Registrar-General's Reports, for Ontario, 1913-1922, inclusive*. (6) GOLDBERGER, James.—*Jour. A. M. A.*, 78:1676 (June 3), 1922. (7) ENRIGHT, J. T.—*Lancet*, 198:988 (May), 1920. (8) HILLMAN, O. S.—*Am. Jour. Med. Sc.*, 145:507, 1913. (9) JOBLING, J. W., ARNOLD, L.—*Jour. of the A. M. A.*, 80:365, (Feb.) 10, 1923. (10) LUSTIG, A.—(*Abstract*) *Jour. A. M. A.*, 80:216 (Jan. 20), 1923.

SOME OF THE FACTORS UPON WHICH THE SUCCESSFUL USE OF LOCAL ANAESTHESIA DEPENDS*

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INTRODUCTION

LOCAL anaesthesia has come to stay. Its many undisputed advantages make its use advisable in an ever increasing variety of surgical conditions. The rapid diffusion of knowledge among surgeons regarding the method of applying it as well as an appreciation of the necessity for a surgical technique compatible with its use, is greatly broadening its scope and taking from the field of general anaesthesia many classes of cases. In the hands of those

trained in its use, almost every field of surgery has been invaded with success, and while one would not have the temerity to predict that local would eventually supplant general anaesthesia in the majority of instances, is it not conceivable that when the average surgeon of to-morrow can exhibit the skill of the expert of to-day, who in his turn may be expected to improve considerably, the relative positions now held by the two methods may be reversed? One finds a considerable number of surgeons who perform more of their major surgical operations under local than under general anaesthesia. Is it not possible that the prediction of

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master surgeons who have performed the vast majority of their operations under general anaesthesia, may be wrong? Is it not possible that an eminent authority upon gastric surgery for instance, might not be qualified to speak authoritatively concerning the subject of local anaesthesia, about some phases of which he cannot possess intimate knowledge? The main defect in opinions of this kind is that they reflect only the experience of those who give them.

The future of local anaesthesia is in the custody of the younger generation of surgeons. A new type of surgery is developing. In this process of evolution we find the young man well trained in the technical surgical details, greatly aided by improved diagnostic methods and thus better equipped at an age when his mind and body are still plastic to assimilate the knowledge which those who have preceded him have left. Thus I find that my assistants can, and often do acquire in a comparatively short time, the ability to carry out a given procedure under local anaesthesia, the ability to accomplish the same having required many years of effort on my part.

It is in an effort to detail some of the requirements for the successful use of the local anaesthesia method that the following suggestions are presented. It is to be noted that these suggestions coincide with the best interests of the patient, a factor which is of course of paramount importance.

The Patient and the Surgeon—Obviously anyone who is properly equipped to do major surgery can, with training, operate under the local anaesthesia method. However, in order to obtain the best results one must bring to the work something more than the ability to diagnose disease and operate. Bearing in mind that these operations are carried out upon the conscious patient, one must possess or develop by cultivation and schooling, a broad, deep sympathy for, and understanding of the patient's mental processes. One must be able almost to feel any pain or indignity which the patient is forced to undergo with more keenness than the patient himself does. Nothing could be farther from the truth than the impression that the local anaesthetist should be of such adamant qualities of mind that he might witness the needless suffering of a patient without being himself indelibly im-

pressed. These qualities—the acute appreciation of the patient's mental attitude—make it possible for the surgeon to attune himself to the proper sympathetic accord and make it practically impossible for him to aid in perpetuating the most potent factor extant in discrediting the use of local anaesthesia, the *production of needless pain*. The surgeon with the requisite mental attributes who will properly prepare himself for the use of local anaesthesia will find that success will depend to some extent upon the factors discussed below.

Equipment and Environment—We have found that the attitude of patients in the private hospital is much more favourable to the method which may be said to be looked upon as more or less of an innovation at the present time, than that of charity patients. Even in private practice the education of patients and hospital attachés is a slow and tiresome process. Conviction of the merits of, and enthusiastic support of the method will naturally be a long time in replacing the prejudice one meets among these individuals. Each failure is apt to be accentuated and successful cases disregarded.

The influence of that wing of the profession which is unable or unwilling to use the method, acts as one of the greatest barriers to its acceptance, and the "anti-local" propaganda of this class produces the same effect here as in corresponding conditions in other branches of medicine.

This factor must therefore be reckoned with and the surgeon must realize that the attitude of his office force, hospital force and the medical profession of his locality, has a direct bearing upon the handicap he is facing. He should therefore make a special effort to meet these influences. The most potent factor in overcoming prejudice is by so applying the method that the actual truth regarding its advantages may become known.

The Operating Room—The use of local anaesthesia being a method in itself demands certain departures from the orthodox method of handling cases and the operating room and its squad should be equipped to meet the change in requirement. Training of attendants and composition of utensils should be designed to reduce noise to a minimum. The operating

table should be one which will tilt in four directions and should be equipped with feather pillows. Some form of artificial light which will illuminate all deep cavities is a *sine qua non*. The room should be properly ventilated and of a proper temperature. Syringes of excellent design and construction, or better, a Pneumatic Injector, should be available, and needles of appropriate lengths and sizes must be at hand. The operating room force must be so trained that they will work swiftly and noiselessly, and visitors must be cautioned as to loud talking, etc. We have used music constantly since 1914 and feel that we could scarcely get along without it. A phonograph or the radio offers a desirable means of diversion to some patients. Every effort should be made to establish an *esprit de corps* among one's assistants so that their work may be as perfect as possible.

Psycho-anaesthetist—One of the prime essentials to the successful use of local anaesthesia is the presence in the operating room of a psycho-anaesthetist. A graduate nurse of tact and judgment should be trained for this position. She should be skilled in the administration of general anaesthesia and in local anaesthesia diplomacy. Her duties include making the acquaintance of the patient as soon as possible after he enters the hospital, recording his blood pressure and acquainting him with the fact that she is to look after him for his doctor during the operation. It is her duty to see that the patient is carefully transported to the operating room and made as comfortable as possible while there. During the operation she records the pulse and blood pressure and attends to the patient's needs regarding air, water and general comfort, instructs him as to co-operation, meets his anxiety with reassurance and co-operates with the surgeon in deciding upon the necessity for giving general anaesthesia which she at once administers should the occasion require.

Local Anaesthesia Technique—As stated above, equipment is of prime importance. In the early days, the horse was but slowly replaced by the automobile. However, he finally had to go. One may be able to use local anaesthesia with crude equipment but to use it successfully and with satisfaction, the most modern mechanical devices must be used. Simplicity,

speed, accuracy, all demand it. The writer's experience leads him to favour infiltration or infiltration block anaesthesia as a rule except in the case of the trigeminus, the brachial plexus, the cervical plexus, the intercostals or when venous, sacral or transsacral are used. This throws a large percentage of major surgical cases into the former class and for this infiltration the Pneumatic Injector is ideal. It furnishes one with a solution under a constant known pressure controlled by the small cut-off with the needle mounted upon a ball and socket joint. The "pistol-grip" effect allows one to introduce solutions into deep cavities, as in the abdomen for instance, without obstructing the view with the hand. Muscle tire is eliminated and the infiltration is reduced to mathematical accuracy. The psycho-anaesthetist has entire charge of the apparatus, the surgeon being concerned only with the cut-off and needles. The self-seating bayonet lock needle which the writer has recently devised, meets every need. It may be removed instantly or as quickly locked in place, and possesses the additional advantage that if broken, the hub may be returned to the factory and the needle repaired at small cost.

In introducing the solution, the painless method of producing all secondary wheals from *beneath* and of anaesthetizing the skin by the subdermal method should be used. The field should be gone over methodically from end to end and all layers injected before beginning the operation. One should, however, not hesitate to reinforce the anaesthesia at any point provided the patient complains or a muscular contraction occurs. Perfect anaesthesia abolishes all reflexes.

Surgical Technique—Important as is the manner of establishing local anaesthesia, it is perhaps of less importance than the type of surgical technique employed when this method is used. Surgical strategy—a technique meeting the demands of local anaesthesia and incidentally the demands of the best interests of our patients—will be the deciding factor between success and failure in a majority of instances. The comfort of the patient, the facility with which the preparation is carried out, the deftness of the induction of the anaesthetic, will greatly aid in the triumphant consummation of any operation of especially difficult

nature. The manner of carrying out the preliminaries may be the deciding factor between a perfect local anaesthesia operation and the necessity for resorting to general anaesthesia. Other factors may be: a degree of bodily discomfort to the patient, the faulty manner of introducing the anaesthetic, the failure to make use of the force of gravity by proper tilting of the operating table or by some overt act in surgical technique, any of which is inimical to success.

A stealthy manner of operating should be developed. The anaesthetic solution should be "sneaked" into the tissues. Pressure while incising should be avoided by elevating the skin. Incomplete anaesthesia should be recognized through the agency of reflex muscular action of the incised tissues rather than by word of the patient. The abdominal viscera should not be exposed in the presence of a positive intraperitoneal pressure. Successful abdominal surgery demands that the condition found at autopsy upon the fresh cadaver present when the peritoneum is incised, a condition which the writer has designated "negative pressure." One may then, by introducing elastic lateral retraction (the writer has devised a variety of wire spring retractors for this purpose) and by elevating the abdominal wall, utilize the force of gravity through the agency of tilting the operating table, with the result that the movable viscera will not obstruct the view and the opportunity will be offered to make a visual examination of the pathology present.

Anterior Splanchnic Anaesthesia—One may now introduce the anaesthetic into the splanchnic regions if this is indicated. It is entirely a matter of obtaining the proper exposure. In

the case of the appendix, its mesentery or if necessary, that of the caecum, may be infiltrated. In the pelvis extensive work demands a preliminary sacral or transsacral block, pericervical infiltration from below or anterior splanchnic at the pelvic brim may be used. Simple pelvic procedures require only local infiltration of the round ligaments.

Proper tilting, the reverse Trendelenberg, and the Trendelenberg position, negative pressure, an appropriate incision, preferably the transverse or the "L," combined with anterior splanchnic anaesthesia and an appropriate surgical technique have met the requirements in the hands of the writer in approximately ninety-five per cent. of his operation cases.

In conclusion I can only reiterate that it is my belief that local anaesthesia will be the choice for those who are willing to master the technique of its use for conditions in which it can be used successfully; that its successful use will depend largely upon refinements in the technique of its induction but more especially upon the development of a surgical technique which corresponds entirely with the demands of the best interests of the surgical patient and that aside from anaesthesia technique and surgical technique, success will be greatly augmented by attention to details which relate to the patient's general comfort. The training of hospital attachés and assistants, the gratification offered by proper equipment, the employment of a tactful psycho-anaesthetist, the utilization of the diverting and solacing effect of music and the radio and an intimate and sympathetic understanding of the patient's mental attitude must all be given special heed by those who expect to be successful in the use of local anaesthesia.

Urticaria caused by light.—W. W. Duke, Kansas City, Mo., reports the case of a woman who became so sensitive to light that on two and one-half minutes' exposure of the skin to direct sunlight, typical itching hives, with erythema of the skin, invariably appeared over the area exposed. The reaction was almost identical to the reaction of allergic individuals on intracutaneous injection of substances to

which they are sensitive. Constitutional symptoms were felt on two occasions when a large area of the skin was exposed to light. Local tolerance was developed by repeated exposure of small areas of the skin to light, but it did not last indefinitely. The reaction was produced only by light of a wave length transmittable by violet glass.—*Journal A. M. A.*, June 23, 1923.

DIVERTICULA OF THE ALIMENTARY CANAL AS DEMONSTRATED BY X-RAY EXAMINATION

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Hamilton

GOULD defines a diverticulum as a pouch or cul-de-sac, whether normal or abnormal, leading from a main cavity. Of normal diverticula we have only a few examples in the human body, such as Meckel's diverticulum and Vater's diverticulum or ampulla. In the present paper we shall consider only the acquired or abnormal diverticula. As Dr. Charles Mayo states "the acquired diverticula comprise practically all the diverticula which are of clinical importance." The oesophageal diverticula or pouches, the various diverticula of the stomach, duodenum and ileum, and the multiple diverticula of the colon, all belong to this group.

Pathologists classify diverticula into true and false, or complete and incomplete, these terms having reference to the structure of the walls of the diverticulum in comparison with the structure of the walls of the organ from which it arose. That is, a true diverticulum has in its walls the same tissues and arranged in the same manner as in the normal organ. Whereas in a false diverticulum the walls consist of but part of the structures found in the normal organ, the structure usually absent being the muscular coat or layer.

In our consideration of the diverticula of the alimentary canal, we will begin at the upper end and consider first of all the diverticula of the pharynx and oesophagus. Pharyngeal pouches, often called oesophageal, are in reality diverticula of the posterior and lateral wall of the pharynx, into the loose areolar tissues around the oesophagus. The hernia usually occurs between the fibres of the inferior constrictor muscle due to a deficiency of the musculature or to some anomaly in the closure of the lower bronchial cleft. These diverticula are usually single, and vary in size from a few millimetres to 8 centimetres or more in diameter. Examination for these pouches is best made with the patient in the upright position

using a thick barium paste, although they may often be outlined by the ordinary barium meal. The fluoroscopic examination is most important in order to distinguish them from stricture.

By watching on the screen while the meal is being taken, the pouch can usually be seen to fill, and when full, the bismuth runs out over the top into the oesophagus and passes readily down into the stomach. In some cases the pouch can be seen to empty into the oesophagus, when the patient contracts the neck muscles. A diverticulum has a smooth rounded base with a fluid level at its upper opening. On the other hand, a stricture has an irregular base and the barium leaves it by the lower end. A carcinomatous stricture is usually conical in shape and irregular in outline, not having the bulbous appearance of a pouch. The distinctive feature then between a diverticulum and any form of stricture is the fact that the former must empty from its upper end and the latter from the lower end.

Plates should always be taken during and following the fluoroscopic examination. As a rule lateral plates in this region will give a much better picture than an oblique or an antero-posterior position, although plates should also be taken in these positions.

Diverticula are rarely found in any other portion of the oesophagus, although a few cases, about 15 in all, have been reported in the last 25 years, and these have practically all been in the lower end of the oesophagus at about the level of the diaphragm. Carmen of the Mayo Clinic reports having seen only one case of diverticulum in this situation. So that the condition must indeed be quite rare.

Dilatation of the lower end of the oesophagus due to spasm or stricture at the cardiac opening is not particularly uncommon, and must be differentiated from a diverticulum. This is usually not difficult, as a diverticulum should present the same characteristics as found in a

pharyngeal pouch, *i.e.* a rounded smooth base and emptying by its upper end.

If we stick to our definition of a diverticulum, namely, that its walls must consist of the same structures as the organ from which it springs, then diverticula of the stomach are also very rare. The pouch or pocket formed outside the stomach wall by a perforating gastric ulcer is not a diverticulum. Even the designation "false or incomplete" diverticulum is not applicable, as the walls are not formed of the same structures as the stomach wall. Faulkner reports one case of a congenital diverticulum found at autopsy, and Charles Mayo records a case with a diverticulum on the wall of the antrum 5 cms. from the pylorus and 4 cms. in depth. Carmen reports a case of an ulcer near the pylorus and close to it a diverticulum. The diagnosis in this case was duodenal ulcer, but the above condition was found at autopsy.

As in the stomach so also in the duodenum, diverticula are quite rare. A goodly number of cases have been reported, but at operation or at autopsy the condition was often found to be either an accessory pocket from a perforating duodenal ulcer, or the gall-bladder filled with the meal through a connecting channel due to a gallstone perforating into the duodenum, or a duodenal ulcer perforating into the gall-bladder. In obstruction of the duodenum, from whatever cause, the bulb or cap may become dilated, and this dilatation may at times form a true diverticulum due to a weakness in one portion of the wall.

Baldwin in 1911, collected and reported 82 cases of diverticulum of the duodenum. In many instances the diverticulum seemed to involve or take the place of the diverticulum of Vater, but about half of the cases were independent of the bile or pancreatic ducts. In 21 cases the diverticulum had perforated into the head of the pancreas. Case in 1917, reported having observed 8 cases of diverticulum of the duodenum, all located in the transverse portion.

We now come to a consideration of diverticula of the large bowel, and it is here that the x-ray has been of the greatest assistance in diagnosing the different pathological conditions found in the colon. Although not as common as some other lesions of the large bowel, diverticula are by no means uncommon, and are being found much more frequently as our search is

being directed along that line. It is only within the last 10 or 12 years that the medical profession has had an appreciation of the importance of this lesion, and to-day it occupies an important place in medical literature, and is recognized as a distinctive pathological condition by every operating surgeon. During the last 7 or 8 years there have been many contributions to the clinical and radiographic features of diverticula, but the best presentation is that by McGrath in his paper "Etiology and Pathogenesis of Colon Diverticula," in which he states that true or complete diverticula are practically never seen in the colon; they are always incomplete, *i.e.* there is a hernia of the mucosa through the musculature commonly where the muscle is penetrated by blood vessels, near the mesenteric border of the colon.

Diverticula may be found in any part of the large bowel, but the great majority are in the descending colon and sigmoid. Of 32 cases reported by McGrath, 27 were in this situation, 3 in the rectum, 1 in the transverse, and 1 in the hepatic colon. The number of diverticula present may vary from 1 to 300 or 400, but the average is 20 to 30, and they vary in size from 1 mm. to 3 inches or more, with an average about the size of a pea. They are usually round or oval and sessile, but occasionally pedunculated, with a minute opening into the bowel. The sacs usually contain fecal material, which sometimes becomes fecaliths. Diverticula of themselves do not necessarily cause any symptoms. Telling estimates that only about 60% of persons with diverticula present symptoms. It is only when pathological changes take place in the walls of the diverticula, due to infection penetrating the walls and setting up inflammation, that the patient has symptoms. The condition which really causes the symptoms is a chronic extramucosal inflammation or a peridiverticulitis, which develops around the diverticulum. This tends to deformity and obstruction of the colon with the resulting symptoms of pain and constipation, but with no passage of blood. Occasionally a diverticulum owing to the thinning out of the wall, or to some unusual strain, may perforate suddenly and set up an acute general peritonitis, or perforating more slowly cause a localized abscess.

Many different theories have been advanced as to the cause of diverticula, but the same general law applies here as in all hernias, *i.e.*

wherever there is increased pressure within a cavity, and a local weakness in the wall, there is likely to be a hernia. In the region where diverticula most commonly occur, namely the descending colon and sigmoid, there is present increased pressure from gas and feces, and weakness in the wall where the blood vessels enter the bowel.

Diverticula occur more commonly in men than in women, in the proportion of about two to one; usually in those with a tendency to obesity, and of about 45 years of age. The symptoms are fairly distinctive. Chronic constipation, sometimes alternating with diarrhoea, but with no discharge of blood, is a nearly constant symptom. Left-sided abdominal pain is usually present and quite severe. In 30% of cases a mass is to be felt in the left lower quadrant. The diagnosis ordinarily rests between carcinoma and multiple diverticula, although the possibility of a left sided appendix must not be overlooked.

In cancer, pain is not usual until obstruction takes place, whereas loss of flesh and blood in the stool are early findings, but we must not forget that it is quite possible to have a cancer engrafted upon a diverticulitis.

The examination for diverticula is made during the routine gastro-intestinal examination by means of the barium meal. Usually 24 hours after the meal has been taken the colon will be found well filled. If the descending colon and sigmoid are not filled at that time, re-examination must be made at intervals to visualize that portion of the bowel while filled. Careful palpation under the screen along with a series of plates, will nearly always demonstrate diverticulitis if present. The diagnostic feature is oval or rounded shadows projecting from, or lying outside the lumen of, the bowel, and usually accompanied by narrowing and filling defects of the colon, due to the peridiverticulitis. As these pockets tend to retain the barium, they can often be better demonstrated several hours after the colon is entirely emptied of the meal, and will then show as round or oval shadows along the course of the colon. A barium enema is not usually as satisfactory for demonstrating these pockets as the meal, but the enema does demonstrate the narrowing and filling defects better than the meal. We should also bear in mind that owing to the small size of the diverticulum or to its contain-

ing feces, or to the narrowing of the outlet, the sac may not fill with the barium, and thus only the filling defects of the colon are visible, and these often resemble a picture of carcinoma.

George groups multiple diverticula into three classes,—the first composed of those cases showing simple diverticula only, with very few, if any, symptoms. The diverticula can usually be seen during the routine meal examination, as round discrete shadows outside of, but close to, the colon. Practically the only condition with which it can be confused is a spastic condition of the colon, where discrete masses may be isolated in the haustra. These shadows will be found to lie within the lumen of the colon, and are only temporary, whereas a diverticulum is extramural and is permanent.

The second class consists of those cases showing early inflammatory changes around the pockets, with nearly always well defined symptoms. The diverticula, usually 20 to 30 in number, will be found in the descending colon and sigmoid region with some involvement of the colon for a few inches and slight narrowing of the lumen with localized tenderness.

In the third group there are present advanced inflammatory changes with marked filling defects and narrowing of the lumen associated with fairly severe symptoms mainly of an obstructive nature. In this and the preceding group, the condition from which it must be differentiated is carcinoma. This is not always possible, as a carcinoma may develop upon a diverticulitis. The history along with the physical findings and the x-ray examination will usually be sufficient to differentiate these conditions.

George calls attention to two points which must be borne in mind in examining the x-ray plates. First, that the appearance of the colon tends to remain constant over long periods of time in a diverticulitis, whereas in cancer frequent examination will show a rapidly progressing lesion. And second, the tumour mass in diverticulitis is outside the wall of the colon and not definitely circumscribed, *i.e.* there is a gradual transition from the normal bowel to the diseased portion, whereas cancer is a growth in the wall of the colon extending into the lumen and is definitely circumscribed with an abrupt transition from normal to diseased tissue.

Case Reports

SYNCHRONOUS RUPTURE OF BILATERAL ECTOPICS*

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Vancouver

THE patient from whom this specimen was removed, was admitted to the Salford Royal Hospital, Manchester, on September 14th, 1922. She had been married sixteen years; had had one child, aged 14, and had not been pregnant since. The last menstrual period commenced on June 29th, lasted five days; amenorrhoea from that date until the 7th September. She then began to lose small quantities of very dark-coloured blood. On the morning of the 13th of September she experienced a very sharp colicky pain in the right iliac fossa, these pains continued for thirty-six hours and were diagnosed by her doctor as being due to a mild attack of appendicitis. At the end of thirty-six hours a very acute pain in the left lower abdomen developed and she at once became very weak and pale; she vomited four times during the day and was sent into hospital seven hours after the onset of pain in left side.

On examination, the abdomen was uniformly distended and diffusely tender, especially over its lower part. The patient was blanched, had a weak thready pulse, and was very restless and thirsty. Under an anesthetic, a soft diffuse mass was palpable through the vaginal fornix, on right side of the pelvis. I diagnosed a right-sided ruptured tubal gestation.

I opened the abdomen through a mid-line sub-umbilical incision. There was a large quantity of dark blood clot in the neighbourhood of the right tube, which contained a gestation sac that had ruptured. I removed the right tube. I then examined the left tube, which contained a gestation sac that, though itself unruptured, had ruptured that portion of the tube which contained it. The foetus was floating in an unruptured amniotic sac. There was still a brisk haemorrhage from the tube and it was from this one that the free fluid blood in the peritoneal cavity had come. This tube was also removed. Recovery has been uneventful.

*Read before the North of England Obstetrical and Gynaecological Society, December, 1922.

I have been able to find records of but one other case. Before the Gynaecological Section of the Royal Society of Medicine of London, in November, 1921, Mr. A. E. Mortimer Woolf showed a specimen of double ruptured interstitial ectopic gestation. In his specimen there was a left interstitial pregnancy with chorionic villi present. On microscopical examination it also showed a right interstitial haematosalpinx but there was no chorionic tissue present microscopically, so the case has not been proved to be a pregnancy. In the specimen which I show, chorionic tissue in abundance is present in both tubes.

I believe that synchronous rupture of bilateral ectopics must be the most uncommon of all possible combinations of extrauterine gestation.

AN UNUSUAL ARRANGEMENT OF THE EXTERNAL GENITALIA

LYON H. APPLEBY, M.D., F.R.C.S., (*Eng.*)

Vancouver

THIS case is reported because of its extreme rarity, I have been unable to find records of any case of a similar nature in man, or of a parallel condition in any of the members of the lower animal kingdom.

The condition might be described as one of transposition of the external genitalia. The patient, a man, was admitted to hospital as a case of carcinoma of the sigmoid colon and it was during routine examination that the following condition was discovered.

The penis arose in the perineum posterior to the scrotum which was attached unusually far forward, on the pubes. The penis was very short measuring one and one half inches, and was normal in every respect except that it was webbed, the web extending between the median perineal raphe and the under surface of the penis, and was attached as far back as the anal margin; it was quite lax, sufficiently so to permit erection. The position of the meatus was normal in relation to the penis.

The scrotum was large and well formed, and when the patient stood erect it completely con-

cealed the penis, it was to all intents and purposes a normal scrotum except that it was placed unusually far forwards and anterior to the penis. The scrotum was not bifid, it was rugose, and the usual median raphe and septum were present. The penile web was also rugose and it is probable that developmentally it is the true scrotum, the functioning scrotum having been developed from the pubic mons Veneris.

Complete transposition of the external genitalia I believe has never before been recorded. The

gibbon has a pair of pubic testes and it would appear to be the only member of the lower animal kingdom, the arrangement of whose external genitalia approximates to the above description.

Although this patient died as a result of intestinal obstruction permission to perform a post mortem examination was refused, so the anatomy of the crura, etc., was not ascertained. The accompanying illustration was obtained by consent *post mortem*. He was married and had four children.



Treatment of Migraine with Peptone—

Joseph L. Miller and B. O. Raulston, Chicago, report the results obtained in twenty-five cases of migraine from the injection of a 5 per cent. solution of Armour's peptone. The solution is prepared by dissolving the peptone-Armour in 0.9 per cent. sodium chlorid solution so as to make a solution of about 6 or 7 per cent. strength. This is neutralized, second normal sodium hydroxid solution and litmus paper being used as an indicator. The solution is then made to the volume required to make a 5 per cent solution, filtered until clear, and then placed in 5 c.c. ampules, and autoclaved in the usual manner. In order to determine whether the preparation is sterile, the ampules are incubated, and if they remain clear, they are ready to use. The first intravenous injection is 0.5 c.c., the dose being rapidly increased to 2 c.c. The interval between injections is unimportant.

Miller and Raulston have usually given two injections a week until the headache disappears; then weekly, and, if the improvement continues, once in two weeks, and finally once a month. It has not been determined how frequently the injections must be given in order to prevent a recurrence. This period will probably show individual variation. - If the injections are discontinued, sooner or later the migraine will return. The longest period of freedom observed after discontinuance of the treatment was nine months. The total number of injections given varied from six to forty-two. Expressed in percentage, 36 per cent. were much improved, 48 per cent. were moderately improved, and 16 per cent. were not benefitted. These results correspond quite closely to those reported in the treatment of hay-fever by desensitization.—*Journal A. M. A.*, June 30, 1923.

Retrospect

GOITRE WITH HYPERTHYROIDISM

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PROBABLY at no previous time has there been available for review and analysis such a number of exhaustive papers on the diagnosis and treatment of goitre with hyperthyroidism, nor has one previously encountered such a wide diversity of views as to the most efficacious method of treatment. Heretofore surgical removal and irradiation have vied for supremacy, but we now, in a forceful series of articles, are assured that an excellent prognosis may be offered to cases which submit to a regimen of "skilful neglect."

In October, 1919, co-operation between the various departments in the treatment of goitre with hyperthyroidism was secured at the Massachusetts General Hospital by the formation of a committee composed of two physicians, a radiologist, and three surgeons; and we now have before us a detailed statement of the results of treatment, both X-ray and surgical, of the cases which have passed before this committee.

Means and Holmes¹ have furnished an exhaustive analysis of the treatment of forty-four cases of exophthalmic (hyperplastic) goitre, treated by X-ray irradiation. Of these forty-four cases, twelve were cured, while sixteen were improved although not rendered entirely free from hyperthyroidism. Of sixteen cases which showed little or no improvement, eight were subsequently cured by operation. Two of the improved cases were also operated upon, with one cure and one death. None were made worse by irradiation. (The term "cure" is applied only to cases in which the basal metabolic rate is reduced permanently to within normal limits). Composite charts illustrate the trend in metabolism, pulse rate, and body weight. The striking effects of X-ray irradiation in particular cases are also vividly portrayed, and it is the opinion of the writers that the data presented are highly suggestive, if, indeed, they are not positive proof, of the beneficial effects of X-ray therapy in cases of exophthalmic goitre. On the other hand, the destructive action of the X-ray upon

the thyroid gland is clearly evidenced by those cases in which a transient myxoedema developed. Where definite improvement is not noted at the end of five months, Means and his colleague consider further exposures undesirable, and they are of the opinion that surgery should then be employed. Emphasis is laid not only upon the limitations of the method, but upon the necessity of accurate dosage and wide spacing of the exposures (three weeks).

Richardson², in association with the same group at the Massachusetts General Hospital, reviews the results of operative treatment of thirty consecutive cases of exophthalmic goitre. By complete surgical treatment is meant the removal of the whole of the gland, except what in the surgeon's opinion is sufficient to maintain normal function. To secure this result more than one operation is necessary, except in mild cases.

Of the thirty cases of subtotal thyroidectomy, twenty-five (85%) showed a drop in metabolism to plus 15 or less. Four cases, with an average basal metabolic rate of plus 69%, although clinically greatly improved, still showed evidence of hyperthyroidism, presumably because an insufficient amount of the gland had been removed. One mild case, which developed hypertrophy of the remaining thyroid tissue, was subjected to a second operation.

A comparison of the composite charts furnished by Richardson and Means and Holmes, shows that the average results in all the cases treated by subtotal thyroidectomy are better than the average results in a selected two-thirds of the cases treated by Roentgen-ray; the metabolism showing a drop to plus 10, as compared with plus 20 in the Roentgen-ray cases, and the pulse a drop to 80, as compared with 90. The weight in the surgical cases showed a tendency to more persistent and greater increase. Richardson agrees with Means and Holmes that the improvement reported by the latter observers as the result of X-ray treatment is too constant and striking to be accidental or merely coincident with normal recessions, as suggested by Plummer. Richardson contends, however, that it is not possible to predict the effect of X-ray irradiation in any given case. He considers that the

chief advantage of the Roentgen-ray treatment is that there is no immediate mortality, and in those cases in which the basal rate is brought to the normal level, the results of X-ray treatment may be considered satisfactory. The chief objections to the employment of the Roentgen-ray are, (1) the temporary character of the relief afforded in the majority of cases: being improved, but not cured, these cases are likely to refuse operation; (2) the danger of permanent myocardial change developing during the period of treatment, where reaction to X-ray is not prompt; (3) the danger of inducing myxoedema, four such cases having developed at the Massachusetts Hospital since the beginning of the X-ray treatment. Richardson concludes that removal of the gland is a more effective form of treatment of exophthalmic goitre than is the use of the Roentgen-ray.

In a series of three papers³, Kessel and his colleagues include their observations upon fifty cases of exophthalmic goitre, from the wards of the Mount Sinai Hospital. All of the patients were carefully selected, with definite and persistent elevation of the basal metabolic rate. The metabolic status was the criterion by which were excluded many cases displaying the cardinal clinical symptoms of exophthalmic goitre—tachycardia, exophthalmos, goitre, and tremour, or the minor symptoms of diarrhoea, sweating, and palpitation, but without elevation of the basal metabolic rate: a group designated by Barger and Dale as "sympathomimetic," to which the authors apply the new term "autonomic imbalance."

Under etiology the authors discuss the predisposing factors, the syndrome of autonomic imbalance being detectable in ninety per cent. of the patients. Of the exciting causes, there was a history of mental shock in close relationship to the onset of the disease in seventy-two per cent. of the cases. There was a focal infection of the tonsils or sinuses in forty per cent.

The subjective and objective symptoms are discussed in detail. Reactions to atropin and epinephrin injections are tabulated.

In the subgrouping of the cases, the pre-existence of autonomic imbalance pointed always to an unfavourable prognosis. In the group of older women, the eye signs were less frequent; goitre small; drug reactions rarely intense; fine tremour usually absent; but auricular fibrillation and diarrhoea much more frequent than in the younger group. In many of the older patients tachycardia alone was constant, and the

basal metabolic rate was high and out of proportion to the other clinical signs. The prognosis in this group was also unfavourable.

The authors are unable to support Plummer's division of cases of hyperthyroidism into toxic hyperplastic (exophthalmic) and toxic non-hyperplastic (toxic adenoma).

Treatment.—The patients were placed at rest, under favourable hygienic and psychic conditions. High caloric diets (3,000 calories) were ordered, and to both nurse and patient was explained the importance of a gain in weight. Cool packs were given for restlessness, insomnia, and sweating. Phenobarbital gr. 1½ was prescribed as a hypnotic. Syrup of iodide of iron was given to reduce the size of the thyroid gland. Focal infections were dealt with surgically. The patients were informed that operation would not be necessary. In two patients with acute exacerbations, accompanied by fever, intravenous injection of thyroxin was followed by lysis and marked improvement. The period of rest in bed varied from six to ten weeks. The patients were then sent to the country for a month. During this latter period the gain in weight was always large.

Results.—There were three deaths, due directly to exophthalmic goitre. Two cases are reported as complete failures. One patient had a remission following over-work and acute tonsillitis; he had previously been well for one year. Three patients are still unfit to resume their occupations. Forty-one (82%) have been socially or economically restored. Twenty-seven of these (54%) were restored within four months. Two patients died from diseases other than exophthalmic goitre, one from gastric carcinoma and the other from pyelitis, pneumonia, and pericarditis.

It is admitted that complete symptomatic recovery does not occur. Of forty-five patients upon whom adequate basal metabolic observations have been made, thirty-two (71%) have a basal metabolism of plus 18. In five others the basal metabolism has fallen to plus 25. That is, in thirty-seven of the forty-five patients included in this particular group (82%), the basal metabolism has fallen below plus 25. Nine patients still have a basal metabolism exceeding 25%. In one case (the oldest member of the group) the basal metabolism has risen under observation.

Among the authors' general conclusions may be mentioned:

(1) That there is a close relationship between exophthalmic goitre and autonomic imbalance, the latter probably being a stage in the development of the former.

(2) That the symptoms of autonomic imbalance are very similar to those in Graves' syndrome, but may co-exist with myxoedema.

(3) That the hyperplastic gland always contains less iodine than the normal or colloid gland; that the iodine content is inversely proportional to the degree of hyperplasia, and that, until a technique is devised for accurately measuring the secretion of the thyroid gland, the relationship between function and morphology is mere speculation.

(4) That adenomatous tissue has less affinity for iodine than the normal tissue in the same gland; that iodine will be bound by the non-tumour tissue before being taken up by the adenoma; that there is no evidence to show that alterations in the functions of an adenoma can occur without alterations in the non-tumour tissue in the same gland.

(5) That variations in the clinical picture are not due to alterations in the histological structure of the thyroid; that adenoma may be seen in any type of disease; that the inference that adenomata may be associated with increased or toxic secretion is unwarranted.

GENERAL COMMENT

The papers by Means and Holmes and by Richardson are illuminated by their candour, and accurately reflect the clinical experiences of physician and surgeon working in co-operation—which means the elimination of the prejudices which generally attach to men of specialized training,—in the desire to be helpful each to the other in the clinical investigation and treatment of a disease, the fundamentals of which medical science has yet failed to establish.

In these, as in the final papers reviewed, a definite and persistent elevation in the basal metabolic rate is considered the *sine qua non* in diagnosis, as it is also considered the only finite index of the results of treatment.

The term "cure" in connection with the Boston cases is applied only to those in which the basal metabolism is reduced permanently to within normal limits. It is recognized, too, by these writers that, while the limits of the surgical field are within sight, the possibilities of Roentgen-ray therapy still extend beyond the horizon. Here should be restated the emphasis laid upon

the importance of accurate dosage and the avoidance of cumulative effects, where X-ray irradiation is employed.

The results as shown in these two papers may conservatively be expressed as 3 to 2 in favour of surgery. Surgery, however, is weighted with a mortality risk,—in well organized clinics between one and three per cent. on the case basis.

It should be emphasized that, where two methods of treatment are available in the same clinic, a certain percentage of patients will fall between the two stools. One can readily understand that an individual, who has entered upon a course of X-ray treatments with high hopes, which, however, were not realized, will feel dubious about the prospects of later surgical interference. And there is a second class, of improved but still toxic individuals, who will be so free from subjective sensations that they too will refuse surgical aid until serious myocardial changes compel them to seek surgical relief. Although the great majority of these late cases are definitely improved by thyroidectomy, they can not possibly be restored to a normal state of health.

One of the "residual symptoms" placed to the discredit of surgery is persistent exophthalmos, whereas the persistence of this sign may bear no more relation to the completeness of the cure than does the abdominal scar to appendectomy.

Considering not only the immediate but the remote results, surgery, in spite of a proximal mortality handicap, still offers the best chances of a permanent recovery from one of the most baneful diseases of all time. The percentage of cures, as pointed out years ago by Kocher, depends largely upon the duration of the disease and the degree of toxicity. Practically all early cases respond promptly and permanently to thyroidectomy.

The Boston combination suggests Kipling's words:

"The Liner she's a lady. . . .

The Man-o'-War's her 'usband."

Where X-ray irradiation fails or is only partially effective, the surgeon is still available.

When we come to view the contributions of Kessel and his associates, we are hampered by low visibility. These papers, in so far as they deal with the diagnosis, pathology, and treatment of exophthalmic goitre, are impressive, but not convincing. Many of the teachings of eminent pathologists and clinicians are swept aside as being unsound. Time will permit of the

consideration of only one fundamental point, which will appeal to all pathologists and clinicians, namely, the differentiation of toxic cases into hyperplastic and adenomatous,—a clinical differentiation which can be confirmed microscopically in all but a very small fraction of cases, this small fraction including cases in which foetal adenoma may be associated with areas of hyperplasia and with the clinical sign of exophthalmos, or even more rarely those cases in which the feature of hyperplasia is present in the adenomatous tissue, with the association of suggestive eye signs. The statement that the view that adenoma may give rise to toxic manifestations, is unwarranted, will not be accepted. Such a statement is contrary to all experience.

Finally, one must utter a word of protest against such irruptions in terminology as "sympa-

thomimetic," which can be handled only with special tackle; "autonomic imbalance," which as a philological ineptitude darkens the mind; and "psychic insult," which is pedantic, hyperbolic, and lacking in humour. Such terms are impossible for use in the spoken word, and in print do violence to one's vision.

BIBLIOGRAPHY

- (1) MEANS AND HOLMES—*Further Observations on the Roentgen-Ray Treatment of Toxic Goitre*—*Archives of Internal Medicine*, March 15th, 1923. (2) RICHARDSON—*Relative Value of Surgery and Roentgen-Ray in the Treatment of Hyperthyroidism*—*Jour. Amer. Med. Assoc.*, March 24th, 1923. (3) KESSEL, HYMAN, AND LANDE—*A Study of Fifty Consecutive Cases of Exophthalmic Goitre*—*Archives of Internal Medicine*, March 15th, 1923. KESSEL AND HYMAN—*Thyroid Enlargement in Individuals without Sympathomimetic Manifestations*—*Amer. Jour. Med. Sci.*, March, 1923. KESSEL AND HYMAN—*The Clinical Manifestations of Disturbances of the Involuntary Nervous System (Autonomic Imbalance)*—*Amer. Jour. Med. Sci.*, April, 1923.

Some Less Frequently Considered Portals of Infection in Arthritis and Iritis.

—Three less frequently considered portals of entry of recurrent infections are discussed by Ernest E. Irons, Chicago: (1) the mucous membranes of the upper respiratory tract; (2) the tissues about the hila of the lungs, and (3) the intestinal tract. In some of these, the lesions are chronic and localized; in others, the infection enters directly through mucous membranes without evident previous lesion. In infectious arthritis, there are sometimes accompanying gastro-intestinal disturbances; in many, these disturbances appear to be secondary effects of the infection, or to result from interference with normal exercise and food-taking; but in some, the relation of symptoms is such as to suggest the possibility that the intestinal infection came first, and that the arthritis resulted from bacteria which entered the body through the intestinal mucosa. There are numerous case reports of iritis associated with gastro-intestinal upsets, constipation or diarrhoea in which healing of the iritis has apparently been hastened by treatment directed toward the intestinal tract, either by laxatives or by modifications in diet, with the elimination or reduction of proteins, fats or carbohydrates. It is entirely possible that the real source of infection in some of these cases was in the intestinal tract as assumed, but in many cases, no evidence is furnished to show that other of the recognized possible sources of infection were

investigated and excluded. Further, it is possible that recovery may have been hastened by some of the measures referred to, indirectly through the improvement of general nutrition and increase of bodily resistance to infection; and hence, the fact of recovery following dietary or other treatment is not conclusive evidence of the direct etiologic relation of the intestinal infection to the iritis. It is thus difficult to prove directly, in the individual case of iritis or arthritis, that the infection that caused the metastatic lesions entered through the intestinal tract; but by demonstrating the absence of other sites of infection, the probability of an intestinal portal of entry may be arrived at, provided the conditions under which invasion of the body from the intestine occurs are known. Four cases of ulcerative colitis were studied, and in two of the four the author isolated organisms in cultures from the blood during febrile periods. In both successful cases the organism isolated was a gram-positive staphylococcus which produced a marked zone of hemolysis on blood agar plates, and was identical with a staphylococcus which occurred in overwhelming numbers in cultures of the stools of the same patients. When conditions are favorable to the entry of organisms through the bowel wall, and when at the same time resistance to infection is depressed, it seems quite possible that metastatic lesions from an intestinal portal may occur.—*Journal A. M. A.*, June 30, 1923.

Editorial

THE ROCKEFELLER FOUNDATION—ITS ACTIVITIES AND ACHIEVEMENTS

THE recent publication by the Rockefeller Foundation of a statement of its expenditures during the last ten years has once more drawn attention to the character of the service which this organization is giving throughout the world in the fight against disease and in assisting medical education and science to be a potent factor in determining the successful issue of this struggle.

This organization was chartered by a special Act of the Legislature of the State of New York passed in May 1913, and it has now completed the first decade of its history. Its endowment was the gift of John D. Rockefeller, Sr. Of this about \$174,000,000 remains, but the Foundation has already expended \$17,500,000 of the principal and all of the income, amounting to about \$59,250,000; while it has already pledged a further amount of \$15,500,000 to a number of medical schools and health projects throughout the world. How carefully and economically this great endowment has been administered may be gathered from one fact which will impress the business mind: of the \$76,757,000 expended in the last ten years, only \$1,107,174, that is 1.44 per cent., were spent in the administrative work of the Foundation, or \$110,717 a year.

Of the \$76,757,000, public health engaged \$18,188,838; medical education \$24,716,859; war relief \$22,298,541; and all other philanthropic work \$10,445,628, charities which included \$1,000,000 given to Mr. Hoover's child-feeding campaign in Europe.

The Foundation established in 1913 the International Health Board to promote public health throughout the world, by demonstrating the methods

and costs of controlling certain diseases, notably hookworm disease, malaria, and yellow fever; by fostering the growth of governmental health agencies; and by encouraging the formation of splendidly staffed, highly equipped schools of hygiene.

Of the magnitude of the war against the hookworm disease an indication is furnished in an estimate made in 1915 that at least 20,000,000 inhabitants of the globe were carriers of this parasite, chiefly in the tropics and sub tropics, but it was prevalent in the mining areas in the temperate zone, particularly in Europe, affecting over 70 per cent. of the population. Its very prevalence over so great an extent of the globe, leading as it does to deterioration of physique and a greater incidence than would otherwise obtain of malaria, pneumonia, and tuberculosis, branded it as a menace to civilization and human welfare in more than one half of the inhabited portions of the globe.

The struggle against it is almost titanic in its magnitude, and is to be carried on so long as there is a focal point anywhere for the spread of the parasite. Its incidence everywhere, in the tropics more particularly, must be prevented or controlled not by the individual effort so much as by constituted authority, state and other organizations, and the International Health Board set itself to the task of demonstrating in centres throughout the affected regions the control of the disease. What success can attend such demonstrations was shown in a county in Virginia in which a survey in 1910 showed that 82.6 per cent. of the school children were infected. An anti-hookworm campaign was instituted with the

result that fifteen months later a survey showed that the infection was reduced to 35.2 per cent. and ultimately, in 1921, to 2.2 per cent. As an outcome, "the glow of health had come to once pallid faces, chronic invalids had returned to active work, farms gave larger returns, the school enrolment had increased, pupils were alert, new energy and spirit manifested themselves" in all the life of the county. Such demonstrations were made by the International Health Board to the governments of eighteen different countries in South, and Central America, the West Indies, India, Ceylon, Borneo, Siam, and Australia. In almost every case the authorities organized for a permanent control of the disease, and in consequence, it is certain that the governments of all the regions of the globe affected will in a few years take such measures as will reduce the prevalence of the disease to an almost negligible minimum.

A similar campaign is being waged against yellow fever by the International Health Board and the result is as promising. "Yellow fever is on the retreat" and the discovery by Noguchi, of the Rockefeller Institute, of the germ causing the fever and of a vaccine and serum for it, will in a few years terminate what has been a scourge of tropical and subtropical America. In its crusade against malaria, begun in 1916, the Board undertook to prove that the disease can be practically eradicated at a *per capita* cost which makes elimination cheaper than tolerating the disease and the demonstrations which were made in nine Southern States to indicate how it could be controlled resulted in showing that substantial reductions in the prevalence of the disease were effected at an average *per capita* cost of \$1.01, and in some localities, of \$0.25.

The Foundation has endeavoured to foster the training of physicians and others who enter a career in preventive medicine. It was found that in the 48 States of the Union less than 11 per

cent. of those engaged in directing or controlling public health, at least 10,000 in number, had undergone special training for this work. On the estimate made that 20 per cent. of the maladies which produce the total death rate can be controlled by the sanitarian, and because prevention calls for a special training which the ordinary course for the medical degree does not exact, it is clear that an effort on a large scale must be made to give the special training to the new recruits to the ranks of the sanitarians, and to this end the Foundation promoted the establishment of special Schools of Hygiene. Some of these it has endowed or assisted in a munificent way. The Johns Hopkins School of Public Health was financed for five years and it has recently been given an endowment of \$6,000,000. The Harvard School of Public Health has been generously supported. These two schools will be the forerunners of others in the United States and elsewhere which will train sanitarians of a highly qualified character as the guardians of the public health in the years to be. To other lines of Public Health work, such as for example, tuberculosis in France, mental hygiene, social hygiene, infantile paralysis, fellowships and public health education, the Foundation has devoted \$3,163,000.

In the assistance it has given to medical education throughout the world the Foundation has established a special record for munificence. It has already given \$24,716,889 and in addition it has pledged \$15,500,000, the much greater part of which is to be devoted to aiding medical schools. It has allocated \$5,000,000 to Canada, it has aided the Medical Faculty of University College Hospital and Medical School, London, to the extent of £1,205,000 and it has given \$3,500,000 towards the cost of reconstructing the medical laboratories and the hospital associated with the University of Brussels. The Foundation has aided the medical school of the University of Chicago, promised

\$1,000,000 to the medical school of Columbia University to enable it and the Presbyterian Hospital, with which it is closely associated, to build on an uptown site a combined medical school and hospital group of buildings.

Perhaps the most novel and at the same time the most far-seeing undertaking of the Foundation is that involved in its effort to introduce western medical science into China, a country of 400,000,000 people, subject to an annual death rate of nearly 5 per cent., the home of disease in all its forms and varieties, and where the traditional lore of medicine is but a mixture of quackery, myth and superstition fostered by an uninterrupted history of nearly four thousand years. The Chinese mind is slow to change. After a century and a half of missionary effort there are not more than three and a half million of Chinese who are adherents of the Christian religion. At this rate of conversion it would take twenty centuries to convert China as a whole to the religious views and the mentality of the western world. This change, however, may be precipitated by the acceptance of western medical science during the next thirty or forty years, and the most influential force in promoting this acceptance is and will be the work of the Union Medical College and Hospital at Peking, which since 1916 has been controlled and financed by the China Medical Board of the Rockefeller Foundation. This College, chartered under the laws of the State of New York and meeting the requirements of the Board of Regents of that State and the Standards of the Association of American

Medical Colleges, is staffed by highly qualified teachers of western origin, the great majority of whom have been trained in America and Great Britain and in this respect as well as in its equipment it will not suffer by comparison with the best American medical school. The college buildings and the hospital associated with it, all of a splendid type, cost more than \$6,000,000, and could not be reproduced in America for less than twice that sum. The annual upkeep amounts to about \$700,000. All this expenditure has been met by the Foundation through its China Medical Board.

Already this School of Medicine is a factor in modernizing the Chinese outlook. To it come each year an increasing number of the best students who will in the next twenty years be leaders and exponents there of western scientific medicine which is bound to be of incalculable benefit to the swarming millions who have hitherto been subject to an incidence of disease without a parallel elsewhere on the globe.

So much for a brief survey of the achievements of the Foundation for the last ten years. It serves to indicate how this great organization is attempting to perform its part in promoting "the well-being of mankind throughout the world," the object of the Foundation, as its charter puts it. It has begun splendidly and it will, under the wise guidance of those now in control of it, prove of incalculable benefit to mankind and thereby transmit to posterity an abiding memory of one whose insight determined the character of so unexampled a munificence as made the Foundation possible.

A. B. M.

THE ANNUAL MEETING

THE annual meeting recently held in Montreal was a notable success from every point of view.

The setting was ideal inasmuch as the spacious quarters on the top floor of

the Mount Royal Hotel permitted of the consolidation in one area of all the manifold interests of the Association.

The arrangements for rapid registration of members were well conceived

and at the booth erected for the purpose were placed the various wickets dealing with railway certificates, incoming mail, local address of visiting members, ticket for entertainment, programme, daily bulletins, etc. Around the walls of the same hall were arranged the commercial exhibits, a fine and varied display. On account of this excellent position the business firms were loud in their approval of this arrangement.

Seven hundred and twenty-seven members were registered, and over one hundred and sixty new members were enrolled.

The programme was printed in a handy pocket size booklet of fifty pages, giving in detail all that had been prepared in the way of scientific and business programmes as well as entertainments; and including those of the societies meeting in conjunction with the C.M.A., i.e., The Canadian Society of Anaesthetists; the Canadian Radiological Society, The Canadian Society for the Study of Diseases of Children and the Canadian Medical Protective Association.

The scientific sessions were well attended in spite of fine weather and the lure of the out-of-doors. The hospital clinics in the forenoons were especially appreciated and much interesting material was presented and discussed.

Of outstanding merit was the orthopaedic clinic by Sir Robert Jones who occupied over an hour, all too short, and with abundant material of some thirty patients demonstrated and discussed the various conditions illustrated.

Sir William Taylor, of Dublin, delivered an interesting paper on intestinal obstruction, dealing in large measure with the subject of intersusception.

Dr. W. J. Mayo's paper, "Septic Factors in the Great Plagues," covered under an original title a discussion of the problem of cancer and tuberculosis.

An interesting and instructive address was delivered by Dr. S. A. Kinnear Wilson, of London, England, on "Queens' Square Hospital and the men who made it." This address, which was profusely illustrated, was presented at the even-

ing reception and delighted a large audience.

The Eye, Ear, Nose and Throat section met separately, having arranged clinics at the hospitals, and sessions at the hotel.

Dr. J. S. Fraser, of Edinburgh, read a paper on, "Cerebellar Abscess," and Dr. Luther C. Peter, of Philadelphia, discussed the diagnostic value of modern Perimetry.

The important business of the Association was dealt with by the Executive and its Council and was presented in more or less finished form to the members at the official luncheons which were held daily.

In a future number of the *Journal* will be announced the business which was dealt with, and the plans for the coming year.

Some mention must be made of the entertainment provided. The official luncheons were a great success. They served to bring friends together for a good time; were a means of obtaining a large attendance for the transaction of business; and ensured against delay in the commencement of the afternoon session.

Guests of honour at these luncheons included Sir Robert Jones, Dr. R. Boulet, President of the College of Physicians and Surgeons of the Province of Quebec, and the Hon. Dr. J. D. Machean, Secretary of the Province of British Columbia.

The reception on Tuesday evening was presided over by Dr. S. E. Grondin, President of the Province of Quebec Medical Association. The address of welcome was delivered by Sir Arthur Currie. Other addresses were given by Drs. Kinnear Wilson and M. J. MacEachran. After the formal addresses had been delivered, the floor was cleared and dancing kept up until a late hour.

The official banquet was the *pièce de résistance*. Nearly four hundred covers were laid and a most enjoyable evening was spent. No speeches were indulged in, but characteristic entertainment was provided by "Jimmy" Rice and his associates.

Through the kindness of Mr. and Mrs. J. W. McConnell, the members and ladies accompanying them were accorded a garden party at their beautiful lake-side home, "Ashburton Downe."

The visiting ladies had special functions arranged for their leisure hours. On the first day, parties were taken on motor drives, in and about the city; on the second day a banquet was held synchronously with the banquet for members. Some one hundred and forty ladies were present. On the third day the ladies were given their choice of a luncheon at the Royal Montreal Golf Club or a sail through the harbour, and down

the river. This last was through the courtesy of the Harbour Commissioners of Montreal, whose tug *Sir Hugh Allan*, was placed at the disposal of its guests for whom a buffet luncheon was served on board.

Great enthusiasm greeted the reading of the financial report which showed a very substantial surplus. The report will shortly be published in these columns.

Not only was the meeting itself a success, but from all sides were heard expressions of satisfaction at the very real impetus given to the activities of the Association in recent years.

MEDICINE AT THE ANNUAL MEETING

THE innovation, if so it might be termed, in this year's programme of the Canadian Medical Association which turned the mornings over to local clinics for the demonstration of cases, and set apart the afternoons for arranged papers and discussions worked out to the greatest good to the greatest number.

So far as the programme in the department of medicine is concerned there is no doubt that spontaneous discussion is most desirable, but as a matter of fact, spontaneity has often been a synonym for unpreparedness, and both good luck and good management might be required to prevent such discussion from becoming desultory.

A set programme, the items of which were bounded by the hands of the clock perhaps limited individual initiative, but furnished excellent "terminal facilities."

The medical subjects treated in the general sessions were essentially those which would interest the average man. myocarditis and nephritis, pleural infections, and diabetes, like the poor, we have always with us, and also like the poor, they are not easily disposed of, and those who were appointed to discuss them, Dr. Kenneth MacKenzie,

Dr. Duncan Graham and Dr. F. J. Banting did not make the mistake of talking over the heads of their audience, and in each instance covered the ground without littering it with detail.

Dr. Wm. Boyd, in discussing epidemic encephalitis, even added to his previous contributions to the subject, and one cannot refrain from commenting upon his suggestion that the virus of encephalitis may continue its activity long after the first shock of its invasion is over.

The medical guest of the meeting, Dr. S. A. Kinnear Wilson, of London, charmed his audience in his public address upon the history of Queen Square and the men who made it, but perhaps even more did he charm the smaller groups in the hospital clinics.

His cultured erudition, moving about with the same ease through the mesencephalon as among the subtleties of English speech was alike the delight and the despair of those who listened to him. *Palmar qui meruit ferat.*

The "Medical Week" of the meeting, in which both before and after as well as during the official sessions, the clinicians of the city were "at home" in their wards and laboratories to groups of visitors was an altogether satisfactory

feature, while the cases picked out for demonstration in the set clinical periods were well chosen for the purpose, and of more than ordinary interest, and the attendance and attention at these group meetings would warrant a repetition of

this type of programme at future sessions of the Association.

Canadian medicine if it were judged from this meeting might with honesty be said to be sound, safe, and sane, with no meteors visible in the June sky.

OUR INTER-PROVINCIAL RELATIONS

THE Committee appointed by the association last year on Inter-provincial Relations, presented through its chairman, Dr. M. T. McEachern, what must be regarded as an interim report. The purpose for which the committee was appointed has already been referred to in a previous editorial, and upon the able functioning of such a committee the more perfect organization of our profession into a national organization will greatly depend. Canada is a country of great length with little breadth, and its West is separated from its East by nearly a thousand miles of wilderness. Its highways have to pass through forest and mountainous districts, and travelling in many places is difficult. Its population is still widely scattered, and physicians desirous of attending annual gatherings have difficulty in finding confreres or substitutes to attend to their practice while absent. There is great danger, therefore, of a large number of our profession remaining strangers to the other portion and in time becoming indifferent to it. There is, therefore, a necessity if we are ever to become a strong national association to develop and strengthen all possible bonds and

ties between the various portions of our country. At the present the most important are the monthly journal and the annual meeting. The committee believe that at the present it is of great importance the *Journal* should be strengthened in every possible way and that it be made a means of intercommunication between all the provinces, and that a great effort should be made to increase its subscription list in order that it may serve this purpose and reach every member of the profession. The committee also suggests the desirability of having permanent headquarters, with a good office, proper equipment and an active personnel. To secure this a more complete organization is a necessity. Our association requires an energetic Field Secretary, and a Council composed of enthusiastic members, in touch with the various provincial organizations and through them with all the county or local units, thus securing definite avenues for interaction and interchange of thought. With such an organization our association should become a service bureau for the entire profession on all matters affecting its interests.

Hemorrhagic Osteomyelitis.—Max Strunsky, New York, reports a case of hemorrhagic osteomyelitis of the tibia following a fall. At operation, a cavity in the bone was found, filled with a viscid, bloody material. The cyst was curetted and scrubbed with iodine and alcohol. The incision was then enlarged over

the entire length of the tibia, and the entire crest of the tibia removed. The graft was cut into fragments and dropped into the cavity, which even then was only one-third filled. The patient recovered entirely in eighteen months.—*Journal A. M. A.*, June 23, 1923.

Editorial Comment

CANADIAN SOCIETY FOR THE STUDY OF THE DISEASES OF CHILDREN

THE first meeting of this society took place in the Mount Royal Hotel on June 15th and 16th, and must be regarded as a very successful beginning to a society which we trust may in future play its part in advancing our knowledge of the many problems of early life. The advisability of forming in Canada a special society for the study of the diseases of infancy and childhood has been questioned. Many consider that the better plan at present would have been to form a section of the general association. All recognize that paediatrics is only a department of general medicine, but it is a department that has to do with the whole body, not merely with a special organ affected to a great extent by disturbances in the general system which must ever be recognized as playing a predominant part. Nevertheless the body in early life has many peculiarities of its own and differs from the adult in its anatomy, physiology and pathology, and presents many special features of great interest and value for the biologist as well as to the physician. Infants and young children are not merely miniature men and women. The work accomplished during the past thirty years by the members of the American Paediatric Society and the influence exerted by the researches and writings of its members have greatly increased the interest of the general profession in the problems of child life, and have placed America in the van of other countries in all the activities connected with child welfare. We look forward to our Canadian Society effecting equally good work.

Until the present year the development of an appreciation by the profession of the importance of the special study of the many problems of child life has been extremely slow and it is only within the past two decades that the claim of paediatrics to be a department of medicine demanding special training and special clinical facilities has been recognized in university calendars. Nevertheless, an awakening to its importance has taken place, and every university of good standing has now its special paediatric staff.

The character of the papers presented at this

first meeting of the Society augurs well for its success. All were of a high order of merit and recorded not only carefully observed facts of importance but also, the results of scientific research in new ground.

We hope to print many of the papers in this *Journal* and we wish for the Society a career of much usefulness.

INDUSTRIAL COLONIES FOR TUBERCULOSIS

ALL those interested in the treatment of tuberculous patients have been watching the success of the method as carried out by Dr. P. C. Varrier-Jones at the Papworth Industrial Colony, Cambridge, established some years ago. In a recent number of the *British Medical Journal* some quotations are given from an address by Dr. Varrier-Jones at the Englewaite Industrial Colony, Cumberland. Varrier-Jones some years ago saw that his advice to patients to work at "a light job" or to eat "a generous diet with plenty of cream" was not sufficient and not even possible if the patient were to think of earning a living wage. He began to look about for a means of allowing the patients to live under conditions in which disease, partially arrested in a sanatorium, could continue to be arrested during the remainder of their days.

The consumptive workman had to be subsidized and this is done at Papworth by the friendly societies and the Cambridgeshire After-Care Association. This subsidy is an insurance by the community against infection. The patients are engaged in such work as poultry farming, carpentry, cabinet making, etc. Tuberculosis is treated at Papworth down to its very base—the home—for the wives and families of the men are there. It is gratifying to note that so far there has not been one case of infection.

This *Journal* extends its congratulations to Dr. Varrier-Jones and other heads of Industrial Colonies upon their achievement in helping to solve the social and medical problem presented by the tuberculous.

A. M.

Correspondence

IN MONTREAL—AT THE ANNUAL
MEETING

To the Editor:

The recent meeting of the Canadian Medical Association in Montreal was signalized by one new departure, the substitution to a large extent of hospital clinics for the usual forbidding array of papers. The warm month of June, following the dreary winter of work, calls us to merrier things than a crowded hall and cold—not cool—scientific subjects inaudibly set forth; and particularly is this so in the merry city of Montreal, P.Q. Rather for us the 19th hole than the 16th amendment, and the grassy brassie than the hardwood of the meeting-room. Under the handicap of this somewhat general sentiment, the Programme Committee made a splendid recovery when they put on the hospital clinics, with the patient and operation as drawing cards, and put off the typewritten stuff. The "dry clinic" of Sir Robert Jones, though held in the hotel, was really a hospital clinic, and was very far from dry. Only in the matter of the two or three symposia was formal talking from prepared papers allowed, and these, fortunately, were so well chosen for their practical bearing upon every day problems of the general practitioner that they held the interest of a large group of the members. We must congratulate the Programme Committee, and would suggest that when the meeting is held in any large city the example of the Montreal men might well be followed.

Sir Robert Jones' clinic on a great variety of orthopaedic subjects was the particular triumph of the whole meeting. It is briefly reviewed in another column. Suffice it to say here that the illustrious Welshman maintained his reputation for complete knowledge and brilliant exposition, and increased, if possible, his universal popularity. To see him wangle that club foot into position was a minor revelation. In the matter of twisted limbs he is in himself *The Compleat Wangler*. Was Izaak Walton a Welshman?

The writer naturally could not attend all the clinics; but the programmes prepared by the various hospitals sounded most attractive. The attendance at each hospital, considering the

very considerable splitting up, was encouraging, at any rate from 10 o'clock on. Nine o'clock (let us frankly admit it) is an early hour, in the eyes of those who come partly for the holiday, and who have dined well the night before; and those of the hospital staff who thought that members might arrive at a clinic at 8 a.m., suffered presumably a quite justifiable disappointment.

Never before has one so desired a magic carpet, or a multiple and divisible personality, each clothed with its proper body. One wanted to be in several places simultaneously. Yet this lack was partly remedied by much conversation, and opinions seemed to be unanimous upon the excellence of all the demonstrations and clinics. It was obvious that a special effort had been made to present the latest information upon the every day subjects that appeal to the general practitioner, and to avoid taking up the precious time of the meeting with the rarer forms of disease and injury. This was particularly shown in the choice of subjects for the symposia. It was pleasant to note that the clinics of our French colleagues were largely attended, and the Association is to be congratulated upon their recent accession to the work of the National Association. They have much to show us that is peculiar to their school of education, and, especially in the matter of treatment much that is new and valuable to us.

Sir William Taylor contributed a useful paper on intestinal obstruction, in which he emphasized anew the incomparable importance of early diagnosis and early operation. In no other way could we reduce the dreadful mortality rate which, he stated, remained still in some clinics around fifty per cent. In favour of the policy of early and active intervention such as he had long followed, he cited his own figures of those deaths in eighty cases. Sir William is to be congratulated on such extraordinarily brilliant results,—results which should remind the practitioner most forcibly of his responsibility toward all patients in whom obstruction is suspected, and of the advisability of particularly early operation.

The symposium on infections and trauma of the hand, was especially interesting to nearly all the members, who are all often called upon to

treat these somewhat dangerous lesions. A short review of this discussion appears elsewhere.

The number registered was much larger than at any previous meeting. Including the ladies, there must have been close on to one thousand

present. Montreal has set a record, and I believe I follow the general sentiment in saying that the meeting as a whole was a huge success.

ONE OF THE SEVEN HUNDRED.

Highlands, June 20th, 1923.

Caffein Intravenously—The Best of Stimulants.—Caffein, as a temporary stimulant given intravenously, is the one and only drug which in the experience of W. W. Duke, Kansas City, Mo., never completely fails. If given subcutaneously, however, it fails as do other stimulants. He reports the case of an old man with bronchopneumonia who suddenly took a turn for the worse and became apparently moribund. He was practically pulseless. Breathing was of the Cheyne-Stokes type and laboured during the periods of dyspnoea. Large, coarse, tracheal râles were audible throughout the ward, owing to accumulation of mucous in the trachea. The patient had been given strychnine, atropin, camphorated oil and strophanthine intravenously, and had shown no response to them whatever. Duke then gave 2 grains of caffein sodiobenzoate intravenously. The patient opened his eyes almost immediately and began to talk. He began to breathe regularly and deeply, and was troubled no further with mucous in the trachea. The pulse became strong and regular. This lasted until the following night, when he again lapsed into the state described and passed away, this time in spite of further use of caffein. This experience has been repeated many times by Duke with almost equally good temporary results. The drug has been used in moribund cardio-renal cases; in uremia associated with coma; in prostate cases with ascending infection; in uremia and coma; in bronchopneumonia with coma, and in general sepsis with coma. The result in the majority of cases has been temporary, and while the drug has often been repeated two or three times with good effect, the later doses have rarely been as effective as the first. In one case, however, caffein was repeatedly used with the result that the patient recovered from an illness which Duke is convinced otherwise would have almost certainly terminated fatally.—*Jour. Am. Med. Assoc.*, April 7, 1923.

Asthenopic Reflex Manifestations Between the Eyes and Teeth.—Relief of eye strain and its manifestations through refraction in made impossible by diseases of the nose and its sinuses and of the pharynx and, rarely, by more remote diseased organs is the assertion made by W. W. Kahn, Detroit. These diseases influence reflexly the functions of the eye. Such sources of malfunction, when unsuspected, keep the oculist uselessly trying for years to cure the asthenopia until, finally, the cause of these reflexes is discovered. Nine such cases are reported. That the nerves which acted as conductors in producing eye reflexes due to bad teeth may also act as agents in producing tooth and gum reflexes due to strained eyes is shown by five cases cited. The nerves that are principally involved in these reflexes are the three divisions of the trigeminal nerve, supplying in part the eye and the teeth. This common innervation makes it obvious that the irritation of one of the many branches of the trigeminal nerve may produce the most varied and unexpected reflex symptoms. The teeth causing eye reflexes usually do not cause local pain and are, therefore, commonly overlooked as causative factors. Toothache and numbness of the gums may be caused by eye strain as easily as eye strain may be caused by bad teeth. There are at least four groups of reflexes manifested in the eye, of which only the least important is caused by live pulps and the three important ones by dead teeth and alveolar abscesses. The irritation of the sympathetic nervous system by abnormal teeth may cause neurasthenia and possibly, in susceptible cases, even insanity. The infected apexes and alveolar processes are, as a rule, not curable by local treatment. Extraction is the method of choice.—*Jour. Am. Med. Assoc.*, April 21, 1923.

Abstracts from Current Literature

MEDICINE

The Heart in Diphtheria. Loth, Mathilde.
Arch. of Int. Med., May 15, 1923.

The series of cases on which this paper is based is small. But the problem is well stated. Clinical evidence shows that death in diphtheria is largely due to circulatory failure, but there is not complete agreement of views on the point of attack; is it the cardiac muscle and its conducting system, or is it extracardiac? The stage at which death occurs is to be reckoned with: where it is early the vasomotor medullary centres are said to be affected, later on interstitial myocarditis is found. Less hard and fast is the view that heart failure during or after diphtheria is not always due to the same cause, but that toxic myocarditis seems to be a large factor.

Experimental work on dogs has shown, however, that the work of the diphtheria poisoned heart is quite as good as that of the normal heart. And yet another worker found that up to a very short time before death the heart appeared to function normally, but that the collapse and death followed on failure of the peripheral blood vessels.

Clinical findings as regards the effect on the heart are less disputed, although the percentages given differ somewhat. Only a relatively small number of cases show serious heart symptoms, but where the cardiac mechanism has been seriously disturbed the outlook is usually extremely grave. One observer in a study of eighty cases concluded that the outcome was usually fatal.

The electrocardiograph affords an accurate estimate of the irregularities. But opinions differ as to the degree of myocardial involvement necessary for such results. Some say that anatomical damage to the myocardium is not necessarily present in gallop rhythm and extrasystoles; others as definitely hold the contrary view. A compromise is reached in the view that lesions of myocardium may cause no symptoms, but the least changes in the bundle do.

A summary of 220 fatal cases showed degeneration of myocardium to be one of the commonest conditions present. Its simplest form was fatty degeneration, which occurred chiefly in short,

severe cases. More prolonged cases showed increasingly severe degrees of muscular degeneration.

The present series consisted of nineteen out of sixty-five fatal cases. The average age of death was 3.6 years; average day of illness on which admitted, 5.8. Antitoxin had been given in all but one before admission. Average duration, 10.8 days. The involvement of the heart, therefore, occurred rather early. The pathological findings showed, in no case, a definite myocarditis, *i.e.*, a true inflammation—there was "more or less cloudy swelling" and fat accumulation and slight increase in interstitial cells.

A series of hearts was studied in cases of severe infections other than diphtheria, and in these, too, a slight increase in cellular elements was found, without any definite inflammatory reaction. Finally, a normal series was examined pathologically, and again a slight increase of interstitial cells was found.

The comparison of findings pointed to quantitative rather than qualitative differences.

Some experimental work on guinea pigs showed that diphtheria antitoxin produced degenerative changes in the heart muscle of the same nature as those found in fatal human cases, but at no stage a definite inflammatory reaction.

H. E. MACDERMOT

Determination and Interpretation of Lung Volumes in Certain Heart Lesions. Lunds-gaard, C., *Jour. A.M.A.*, Jan. 20, 1923, LXXX, 163-167.

The various lung volumes, "residual," "reserve," and "complementary" air, and "total," "middle" and "vital" capacity, are defined and their range of normal variations is presented in tabulated form from studies carried on in Professor Faber's clinic in Copenhagen. The author then proceeds to discuss the changes that take place in each of these several volumes in heart disease. Vital capacity is measured by the ordinary spirometer. Changes in vital capacity depend upon variations either in the total capacity or the residual air, and a knowledge of these is, therefore, important. These volumes are estimated by one of the common dilution methods (breathing in and out of a

closed bag). The values so obtained are expressed in terms of percentage of the normal values of the individual calculated from the size of the chest wall, after correction for diminished excursion of chest has been made. Eleven cases of heart disease studied in this manner are presented. The total capacity was normal in the incipient stage, decreased in the later stages of compensation and still further decreased when decompensation occurred. Vital capacity decreases progressively from the onset up to and throughout the stage of failing compensation. Residual air at first rises and remains up during the entire stage of compensation; after decompensation occurs it is decreased, owing to the increase in the fluid contents of the chest, particularly of the alveoli. The conclusion is drawn that in heart disease the vital capacity cannot in the course of effective treatment return to normal, because even if the total capacity becomes normal, the residual air remains increased on account of the increased pressure in the pulmonary circulation. M. E. ABBOTT

On the Technique of the Determination of the Velocity of the Arterial Pulse Wave. Lundsgaard, C., and Beyerholm, O. *Arch. of Int. Med.*, Jan., 1923, XXXI, 55-62.

The "hot wire" apparatus of Tucker and Hill for registration of the pulse and heart beat on the electrocardiograph suggested to the authors the idea that the camera of this instrument might be employed to record the curve of the arterial pulse at the same time with the electrocardiogram, and thus supply a means to study of the velocity of the wave. Two arterial receivers are applied, one to the carotid, the other to the radial artery. The latter is of the spring variety used by Mackenzie, with rubber straps attached to the support to prevent its slipping. The carotid receiver is an ordinary metal tambour with a long shank and in its centre a small metal knob for application to the artery. The photographic plate or film must move with a speed two or three times that for recording electrocardiograms alone. The arrangement has the advantage of indicating to what phase of the contraction a different heart wave corresponds, and is very useful for correlating the velocity of arterial waves in various forms of arrhythmia. Several such combined curves are reproduced in the paper. The results of a series of observa-

tions on both healthy and diseased patients will be communicated later. M. E. ABBOTT

The Production of Heart Murmurs. Reid, W. D. *Am. Jour. Med. Sc.*, March, 1923.

This excellent paper deals with the history of the subject, with experiments performed by the writer, and with the clinical and pathological data obtained from eighty cases at the Boston City Hospital, in 1921. Great praise is given to the interpretation which M. A. Chauveau, of Lyons, placed upon his own experimental work of 1858.

The writer's conclusions may be summarized as follows: A murmur is most readily produced where a *veine fluide* or jet is formed as in, (1) a stenosis or narrowing of the vessel, and (2) a sudden increase in its calibre. A certain velocity of the stream is necessary. The loudness or intensity of the murmur is, within certain limits, proportional to the velocity of the stream. The murmur is propagated both up and down stream, but better in the latter direction. A murmur is readily caused by a cul-de-sac in the wall of the vessel facing the current and even a sharp edge or lip is enough to cause a murmur. The murmur produced by the cul-de-sac is not so intense as that associated with a *veine fluide* and it is transmitted better up than down the stream.

It would appear that roughness of the inner lining of the tube does not cause a murmur, or, if it is present, it is very slight and in no sense comparable with the murmur produced by a *veine fluide* or by a cul-de-sac facing the stream. Earlier observers were not in agreement about the influence of roughness of the vessel wall and in experiments great care must be exercised not to cause a stenosis as well.

Conditions for the formation of a *veine fluide* or cul-de-sac may be, and often are, present together in the human heart. The quality of the murmur is influenced by the character of the vessel wall at the site of its production. Resonance, reflection, and refraction of sounds may alter murmurs in their transmission. Finally, Reid concludes that a murmur is not mysterious phenomenon incapable of explanation, but is one kind of sound and that it is subject to the general physical laws of sound.

ARCHIBALD MALLOCH

The Common Sources of Error in Lung Examinations. Duncan, E. A. *Jour. A.M.A.*, April 28th, 1923.

In the author's opinion, erroneous diagnoses of pulmonary tuberculosis are almost always based upon description of non-existing or misinterpreted physical signs. A sign of increased density especially at the apices is not sufficient in itself for the conclusion that the case is one of tuberculosis. This applies to alterations in fremitus, changes in the percussion note, and to abnormal breath sounds.

Normal differences of the two sides must be borne in mind. Fremitus is normally greater over the whole of the right lung than over the left. The percussion note is shorter and of a higher pitch over the right apex than over the left one. Normally there is broncho-vesicular breathing from the right apex down to the second rib in front and to the third dorsal spine behind. Duncan says that the prolonged expiration of this type of breathing is lower in pitch than inspiration. In bronchial breathing, however, inspiration is roughened and expiration is prolonged and of equal pitch or even of a higher pitch than inspiration. To provoke or produce moist râles it is important to reduce the pulmonary volume and flatten out the bronchioles by expiration, get the patient to cough, and, finally, to inspire. Care must be taken to exclude extrapulmonary noises such as muscle sounds, sounds made at the sternoclavicular points, sounds made by the patient swallowing, and sounds made at the margins of the lungs. Basal bronchitis without involvement of the upper lobe must be proved to be tuberculosis by the laboratory before such a diagnosis can be made.

ARCHIBALD MALLOCH

The Modification of Gastric Function by Means of Drugs. Bennett, T. I. *Brit. Med. Jour.*, March 3rd, 1923.

This paper, read before the Section of Therapeutics and Pharmacology, Royal Society of Medicine, October, 1922, deals with the influence of a number of drugs on gastric secretion and motility. The effects of a drug on secretion is illustrated by fractional gastric analysis curves made before and after administration. The effect on motility is shown by reproductions of plates of an opaque meal taken first before, and again after, the administration of the drug to be tested.

Atropine shows a definite effect in diminishing secretion and this was most marked when given by mouth, or when the stomach was washed out with a weak solution. Pilocarpine causes increased secretion, but this was often masked by the profuse salivation which it produced. Alkalis were found to have a neutralizing effect in acid secretion when given some time after a meal, but if given before or at the same time as a meal it was found that they were first neutralized and then caused an actual increase in acid.

The administration of hydrochloric acid was found to be of value, but had to be given in large doses. Its chief value seemed to be that it stimulated closure of the pylorus and so prevented too rapid emptying of the stomach in cases of achylia and that it was a good antiseptic. The chief value of the bitters seems to be in the stimulating effect of the alcohol which they contain.

In the study of motility it was found that atropine delayed the emptying time of the stomach and pylorospasm and reflex hour glass contraction could be caused to disappear under full doses. Strychnine in small doses caused diminution in the emptying time of the stomach, but larger doses caused a spastic condition of the pyloric portion and delayed emptying time. The local action of adrenaline on gastric secretion and motility was also investigated, but although strength up to 1 in 5 were used, no evidence of any action was observed. R. H. M. HARDISTY

The Permeability of the Intestinal Mucosa to Certain Types of Bacteria, Determined by Cultures from the Thoracic Duct. Williamson, C. S. and Brown, R. O. *Am. Jour. Med. Sc.*, April, 1923.

It is an important question "how do bacteria from the digestive tract or peritoneal cavity cause pulmonary infections?" The authors have carried out some experiments with dogs, the result of which clear the ground, so to speak, a little. Under aseptic conditions a thoracic fistula was produced by exposing the junctions of the thoracic duct, internal and external jugular veins. The vein was ligated between the entrance of the duct and the heart, the internal jugular was ligated, the external jugular was tied, cut, and a catheter introduced into its proximal end and brought out through the skin of the neck and the end of the vein sutured to the skin. In a few days the catheter was removed leaving a patent

fistula through which lymph flowed from two to four weeks.

The non-pathogenic *bacillus prodigiosus* (not commonly found in the laboratory) was used in saline suspension for the experiments. It was not possible to recover the organism from the fistula by culture of the lymph after ingestion of the organisms. The negative results were not influenced by diet or by trauma due to exposure of the viscera or to standard operative procedures. To exclude the possibility that the hydrochloric acid of the stomach destroyed the organisms, the saline suspension was introduced into a jejunal fistula, in a series of animals the results were again negative. Cultures of the faeces from the ingested bacteria were negative.

On the other hand, in fifty per cent. of the experiments positive cultures were obtained from the thoracic duct fistula following the injection of the organism into the peritoneal cavity.

It will be seen that in the above experiments it was not possible to rule out a destructive action of the digestive juices below the jejunum. Again, the disappearance of the organisms may, perhaps, be accounted for by their absorption through the intestinal villi into the blood stream. This point was not investigated.

ARCHIBALD MALLOCH

SURGERY

Cranial and Intracranial Endotheliomata—

Haemicraniosis. Penfield, Wilder G. *Surg. Gynaec. and Obstet.*, May, 1923. Vol. 36, No. 5, p. 657.

This is a paper on cases of intracranial neoplasm associated with exostoses of the skull. In 420 cases of brain tumour occurring in the service of the National Hospital for Paralyzed and Epileptic, London, ten showed a bony prominence of the skull immediately beneath which lay the tumour. Seven were operated on by Sir Victor Horsley and two by Mr. Percy Sargent. In nine, microscopical studies were made and nine similar cases were found reported; those by French authors under the name hemicraniosis. Cases cited of endothelioma of skull continue for years, ten years, three years, ten years, two years, ten years, ten years, etc., before neurological symptoms appear. They present first only signs of irregular bony growth followed by neurological symptoms due to increased intracranial pressure and encroachment on the brain.

Recoveries are noted, patients alive and well and working, sixteen years, twelve years, etc., after operation where bone, dura and subdural tumour masses were removed. A review of the literature with cases reported from 1883 to 1920 follows the ten case histories given in detail from the National Hospital. Sarcomata perforate the skull and differ from the endotheliomata originating in the dura, which infiltrate the bone and cause overgrowth and bosses. Endotheliomata are more common than sarcomata and many of the latter so reported are really endotheliomata. A certain number appear to follow skull traumatism, two out of ten in this series; trauma preceded bony tumour in one by seven years. Of six operated on, three recovered, one to die later from plastic operation, two died from haemorrhage and one from pneumonia. These six occurred in the eleven cases reported in the literature; nine cases were operated on of the ten National Hospital cases, four died, the latest seven weeks after operation from sepsis, two within thirty-six hours, one twelve days after. Five were discharged cured, two were not traced, three are living. Early operation is indicated and offers perfect results, if the intracranial tumour masses are not extensive, or if there is not *typical bony swelling and pain beneath*, usually of a stabbing character. Tumours occur chiefly in frontal, temporal and parietal regions, none are recorded in the occipital region. They originate from the arachnoidea or inner layer of the *dura mater*, displacing, without infiltrating, the brain.

CHAS. K. P. HENRY

The Conservation of Muscles in Paralytic Deformities of the Foot. Roberts, P. W. *Journ. of Bone and Joint Surg.*, Jan., 1923. Vol. 5, No. 1, pp. 123-126.

The writer points out that a muscle which does not function after poliomyelitis is not necessarily permanently paralyzed, but may be suffering from overstretching, a remediable condition; also that where a group of muscles is supplied by the same terminal nerve no one member of the group is likely to be completely paralyzed if the others have good power.

He quotes the case of a school teacher with apparent paralysis of the calf muscles, whose lameness was cured by shortening the tendo Achilles and protecting it from strain for a year. The paralysis was due to overstretching and was cured by giving the calf muscles a chance to re-

gain strength. A second case concerns paralytic equino-varus for which astragalectomy was advised. Here the foot was strengthened by lengthening the tendo Achilles and removing a wedge of bone from the outer side of the foot with marked return of power.

J. A. NUTTER

Synovectomy in Chronic Infectious Arthritis. Swett, Paul P. *Journ. of Bone and Joint Surg.*, Jan., 1923. Vol. 5, No. 1, pp. 110-120.

The writer describes cases in which he has dissected out diseased synovial tissue from knee joints hopelessly infected, going in where the swelling was greatest, closing without drainage and using no fixation. It is held that removal of diseased tissue would promote joint function, and also that the diseased synovium was likely a source of infection in itself. The results have been good, save in one case where the joint cartilages were ulcerated. Painless function was restored in the operated knee joints, though in several cases the operation needed repetition. The cases were, in general, those showing apparently hopeless involvement of many joints, where removal of all possible foci of infection had been done. By removal of the diseased synovial membranes of the knees not only were these joints restored to painless motion, but the patient's general condition was improved and often permitted a return to ordinary work. No definite information was got from culturing the synovial fluid or the diseased tissue. Cases of hypertrophic or atrophic arthritis are not to be operated on, nor those in which the cartilages are involved.

J. A. NUTTER

Osteochondritis Dissecans. Freiberg, A. H. *Journ. of Bone and Joint Surg.*, Jan., 1923. Vol. 5, No. 1, pp. 3-16.

This disease, known chiefly in the knee joint as a source of loose bodies, is discussed as a typical joint lesion. Five cases are reported, four in the knee and one in the elbow. Trauma is shown to be unnecessary or slight; the X-rays reveal a characteristic defect in the internal condyle bordering on the intercondylar notch, from which origin one or several pieces of bone arise, at first pedicled, later free. The symptoms in the knee are those of a loose body, with limitation of full extension, and disability on walking. It is not seen in childhood. Trauma, which is insisted on by some, must in any case be

of an indirect nature. The treatment is surgical, involving the removal of *all* loose pieces of bone, which will have been found to have been exfoliated from the defect or niche mentioned above, which niche is always in the same position, varying only in size. The process of exfoliation seems due to an infarction, but what causes the infarction is not yet settled, whether fat embolism or otherwise. It is in the region of the *arteria genu media* ramifying on the posterior crucial ligament, and the writer inclines to the belief that an abnormally long tubercle of the tibial spine may injure the artery in certain positions.

J. A. NUTTER

Artificial Nerve Branches for Innervation of Paralyzed Muscles. Stookey, Byron. *Arch. of Surg.*, May, 1923. Vol. 6, No. 3, p. 731

In a series of experiments upon five dogs the musculocutaneous nerve was cut immediately distal to its formation, the central end tied with silk and implanted in the pectoralis major muscle, thus producing a paralysis of the biceps. A 3 cm. segment of a cutaneous branch of the ulnar nerve was completely freed, one end implanted into the main trunk of the ulnar nerve through a transverse incision, and the other end implanted directly into the substance of the biceps muscle.

The results indicate that it is possible by this means to re-innervate a paralyzed muscle.

The conclusions are based on the subsequent contractions of the muscle, on the normal size, colour and striations of the muscle, and above all on the finding of nerve branches and nerve fibres in the muscle thus innervated.

F. J. TEES

A Method for the Localization of Brain Tumours in Comatose Patients. Dandy, Walter E. *Surg., Gynaec. and Obstet.*, May, 1923. Vol. 36, No. 5, p. 641.

There are two sites, the brain stem and the left temporal lobe, where extirpation is not possible or justifiable. Otherwise, extirpation of brain tumours is to be carried out as it is the only cure. The location of brain tumours can usually be determined even in unconscious patients, the character only at operation. Neurologically and roentgenologically, only fifty per cent. of brain tumours can be localized, most of the balance can be localized pneumographically. In emergency the latter is not possible and the author describes the only available method of localization in un-

conscious patients, *viz.* the estimation of the size, position and intercommunication of the cerebral ventricles by aspiration of the fluid in the lateral ventricles. Practically all intracranial tumours alter the size, position and shape of the ventricles in some degree. Ventricular puncture determines alteration in position, aspiration of fluid changes in size, and injection of a dye the intercommunication of the various parts of the ventricular system. Such a procedure will determine whether a tumour is above the tentorium or not, and if above, in which hemisphere, often in which pole. Puncture is done in the occipital region because (a) the largest part of the ventricle is here, the vestibule, (b) it is the most easily reached, and (c) is less easily collapsed or dislocated. Both ventricles must be punctured. Puncture should reveal abnormalities in position and size by variation in direction of needle and its depth when the ventricle is reached. A failure to reach either ventricle throws out hydrocephalus due to growths in the third ventricle, brain stem or cerebellum. Fluid aspirated and measured determines the size, 25 c.c. or over indicates a dilated ventricle. Where dislocated, the brain tumour is always on the side from which the dislocation has occurred. If shown by posterior puncture the tumour is in the posterior half of the cerebral pole. The lateral ventricles are normally equal, the smaller one on puncture is on the side of the tumour. A ventricle which gives 25 c.c. of fluid has no tumour in the containing cerebral hemisphere. To determine intercommunication, 1 or 2 c.c. of indigocarmine are injected into first ventricle punctured and second punctured and fluid noted. If no dye passes, the tumour is in the anterior or middle fossa. If both are dilated and the fluid passes, it is in the posterior fossa. If due to obstructive hydrocephalus, no dye is obtained on lumbar puncture. The dye test will eliminate tumours of the pituitary, third ventricle and some of the pineal body. With the dye test practically all tumours in the posterior fossa can be found at operation. If both ventricles are dilated and dye is found at a sub-tentorial decompression in quantity, there must

be a communicating hydrocephalus and no tumour. A series of six cases of brain tumour, occurring in patients in coma, is given, illustrated by diagrams, ventriculograms and photographs. The method does not supplant ventriculography, but offers an emergency diagnosis, and by relief of intraventricular pressure offers the best aid for immediate operative relief in otherwise hopeless cases.

CHAS. K. P. HENRY

ANAESTHETICS

Clinical and Statistical Account of Spinal and Local Anaesthesia, as Practised at the Garrison Hospital at Aquila. Ciaprin, Gino. *Il Policlinico*, Jan. 22, 1923.

The writer thinks that the dangers of spinal anaesthesia have been much exaggerated. He has used it in 286 cases. In 284 he used stovaine and in two, novocaine. Pallor, sweating and vomiting occurred in fifty-three cases, but there were no deaths. In twenty-six cases, the first injection failed, but a second and successful one was made at once. The failure of the first injection in these cases was found to be due to chemical change in the stovaine. In one case it was found impossible to reach the spinal canal with the needle. Where novocaine was used no anaesthesia was obtained and both patients suffered afterwards from severe headache, high fever and vomiting. One of these cases had, in addition, delirium and cardiac arrhythmia. The headache and fever lasted for three days.

These symptoms were not thought to be due to any chemical change in the novocaine as it was used subsequently in both cases for local anaesthesia with satisfactory results.

There were two cases of paraplegia after the use of stovaine, one coming on in two, and the other in three weeks after operation. They both lasted about a month, and ultimately recovered completely.

Local anaesthesia was used in 105 cases. In twelve of these stovaine was used. It was discarded owing to its tendency to cause necrosis.

W. B. HOWELL

High Grade Choked Disks in Epidemic Encephalitis.—William G. Spiller, Philadelphia, reviews the literature to determine what has been published concerning choked disks in

epidemic encephalitis, and reports two more cases which came under his observation.—*Journal A. M. A.*, June 23, 1923.

News Items

GENERAL NEWS

Dr. A. D. Blackader, editor of the *Journal*, sailed on July 8th, for a short holiday in England. All communications relative to editorial matters should be addressed "Care of The Canadian Medical Association, 836 University Street, Montreal."

The Association suffered a severe loss in the untimely death of Lt. Colonel William Malloch Hart, M.C., M.D., who died in Ottawa last month.

In the leaflet headed, "Canadian agencies for the diagnosis and treatment for tuberculosis," interesting figures on the tuberculosis problem are given; these figures include the population of each province, the death rate per 100,000 from tuberculosis, the number of sanatoria and details of their equipment; interesting notes are given in regard to the existence of clinics devoted to diseases of the chest, open air schools, and diagnostic laboratories. In addition to these details, the grants of the various provincial governments are stated.

It is interesting to see that the prairie provinces, Alberta and Saskatchewan have the lowest death rate from tuberculosis, fifty-two and forty-three deaths per 100,000 of population. Prince Edward Island, Nova Scotia, and Quebec, with 143, 134, and 122 deaths per 100,000 make the worst showing of the provinces. New Brunswick shows 104 deaths per 100,000, British Columbia 78 deaths per 100,000, Manitoba 69 deaths per 100,000, Ontario 71 deaths per 100,000. One realizes that in the prairie provinces the low death rate may be partly accounted for by the fact that only the very fit attempt life in these provinces; the high death rate in Prince Edward Island, Nova Scotia and Quebec as compared with Ontario is very striking. There are 2,000 sanatoria beds in Ontario as against 513 in Quebec, and Ontario's grant was \$280,000 as compared with \$135,000 for the province of Quebec. In sanatoria, clinics devoted to diseases of the chest, diagnostic laboratories, and in special accommodation for tuberculous patients amongst

the insane, Ontario is easily in the lead. The leaflet is compiled by the Canadian Tuberculosis Association, printed by the courtesy of the Federal Department of Health. Further information is available from the secretary, Bank Street, Ottawa.

A postgraduate medical course on the diseases of infants (*Cours de Perfectionnement Clinique et de Médecine des Enfants*) will be held in Paris during August and September at the Hôpital des Enfants Malades, 149 rue de Sevres, under the direction of Professor Nobecourt and Dr. Lereboullet, with the assistance of other well-known physicians. The course includes lectures and demonstrations upon diseases of all the different systems and laboratory and x-ray work. The fee is 150 francs. A certificate of attendance will be given at the end of the course.

The Canadian Tuberculosis Association met in the University of Alberta, on June 12th. The first morning session was occupied by papers contributed by Drs. Jarry, Torrance, Logie, Vrooman, Leclerc, Boughton, Ritchie, Adamson, Ogden and Baker. In the afternoon there was a joint meeting with the Canadian Public Health Congress. Dr. J. H. Holbrook addressed the meeting. In the evening, directly after dinner, there was a business meeting followed by the President's address. At the joint public meeting in the evening, Dr. Parfitt addressed the gathering. On Wednesday morning clinics were held in the wards of the University Hospital, and in the afternoon a joint meeting took place with the Public Health Congress, which was addressed by Dr. D. A. Stewart, of Ninette, Man. The following morning was devoted to the meeting of the Public Health Congress, and the meeting in the afternoon was addressed by Dr. C. J. Hastings. We hope to present to our readers many of the papers contributed to this very interesting meeting.

NOVA SCOTIA

At the annual re-organization of the Halifax Health Board, Dr. J. L. Churchill was re-elected Chairman.

Dr. George MacIntosh, of Halifax, who has been critically ill with septic infection of the right hand, is slowly recovering in the V.G. Hospital, after having had a serious surgical operation.

Dr. H. K. MacDonald and Dr. George H. Murphy attended the meeting of the Maritime Branch of the American College of Surgeons, on the 11th and 12th of May, at St. John, N.B.

Dr. J. G. MacDougall, of Halifax, Dr. Ross Miller, of Amherst, and Dr. I. M. Lovitt, of Yarmouth, returned recently from their seven weeks' trip to South America with the Fellows of the American College of Surgeons. Dr. MacDougall, being a Vice-President of the organization, presided at various meetings along the way, and was made a Fellow of the Academy of Medicine, Rio de Janeiro.

The Provincial Department of Health announces in *Public Health Notes* for May, that plans have been completed for a monthly tabulation of birth and death

statistics with a fairly complete summary, to be kept well up to date. This will be of great help to the medical profession and to public health workers.

The annual meeting of the Colchester and Hants Medical Society was held in Truro on the 31st of May, and elected the following officers: President, Dr. F. F. Eaton, Truro; Vice-President, Dr. A. R. Reid, Brooklyn; Secretary-Treasurer, Dr. H. V. Kent, Truro; Executive Committee, Dr. C. H. Morris, Windsor, and Dr. R. O. Shafford, Londonderry.

The Sixteenth Annual Meeting of the Valley Medical Society was held at Digby on the 29th of May. Dr. DuVernet, as Mayor of the town gave the address of welcome. The newly elected officers are, Dr. A. S. Burns, Kentville, President; Vice-President for Annapolis, Dr. L. B. W. Braine, Annapolis; Vice-President for Digby, Dr. W. R. Dickie, Barton; Vice-President for Kings, Dr. M. R. Elliott, Wolfville; Secretary-Treasurer, Dr. C. E. DeWitt, Wolfville. The Society had a most interesting all day programme with seven o'clock dinner. Dr. Smith L. Walker, Associate Secretary of the Nova Scotia Medical Society and Provincial Red Cross Commissioner, Colonel H. A. Chisholm of the Provincial

Health Department, and Dr. Glen Donovan were present and delivered the addresses. The Medical Society placed itself on record as heartily in favour of a Ministry of Public Health in Nova Scotia.

Health Centre activities for the M.H.C. for the month of April, show a total of 2,140 families receiving guidance from the public health nurses and visiting house-keepers; 1,156 families are under the supervision of clinics, where they receive medical, dental, and nutritional guidance from the physicians in attendance. Ten hundred and thirty-one babies under two years of age, are being supervised in their homes. The clinic activities show a total of 930 medical, dental, and nursing consultations. In seventeen instances, the public health nurses found illness requiring the calling of a family doctor, and in eight instances, families who had been necessitous were discharged as now being able to return to their family physicians.

The Fifty-Ninth Spring Convocation of Dalhousie University was held on the 10th of May, when a new record was made by graduating the largest class of medical students in the history of the University. The names of those receiving degrees of M.D., C.M., are as follows:

Doctor of Medicine and Master of Surgery—Chase, Margaret Rebecca, B.A. (Acadia), Greenwich; Christianson, Phebe Kirsten, Halifax; Cochrane, Dara Mason, Fox River; Cochrane, Perry Stanley, Fox River; Cooper, Reginald Frederick Clough, Savanna la mar, Jamaica; Corbett, Herbert Redmond, Halifax; Davis, Edwin Cosman, St. John, N.B.; Dolan, Harold Sylvester, B.A., South Nelson, N.B.; Holland, Clyde Wallace, B.A., Halifax; Kinley, Cecil Edwin, Lunenburg; Levine, Maurice, Yarmouth; Lyons, Hubert Antoine, Kentville; MacLeod, Clement, Halifax; Medjuck, Abraham, Caledonia Mines; Murray, Foster Sproull, Leitch's Creek; Nickle, Frederick James, Malone, Ont.; Peppard, Stanley

Harcourt, Pugwash; Pidgeon, Ira Sanborn, Halifax; Rowlings, David MacPherson, Musquodoboit Harbour; Wilson, Frank Gordon, Sydney.

Doctor of Dental Surgery—Thompson, Hazel Alice, Halifax; Blanchard, Frank Milne, Shelburne; Calkin, Victor Clyde, New Glasgow; Clay, Merrill Allan, New Glasgow; Climo, Charles Bryce Hannay, Halifax; Crosby, Hazlett Saunders, Halifax; Dooley, Cyril Jeremiah, North Sydney; Florian, Sydney Dillon, Sydney; Fluck, Walter Leon, Halifax; Heal, Harold Harcourt, Liverpool; Hogan, Michael Francis, Carbonear, Nfld.; Johnson, Karl Payson, Halifax; Macdonald, Norman Stanley, Grand Bank, Nfld.; MacIsaac, Stephen George, Sydney; McLellan, Adam Johnson, Noel Shore; Morrison, Michael Edward, River Bourgeois; Roop, Lionel Balmoral, Bear River.

Clyde Wallace Holland received the University Medal awarded by the Faculty of Medicine to the student making the highest average in his senior year and in the last three years of the Course. Dr. Holland is a graduate of the University in Arts, and served with distinction with the C.E.F.

In his Convocation address, President MacKenzie announced the appointment of Dr. Douglas McIntosh as the first Professor to the Chair of Chemical Research. This appointment is well received throughout the Maritime Provinces. Professor McIntosh has filled chairs with distinction at McGill University and in British Columbia, and for the last three years he has been doing industrial research work in the United States. At the conclusion of Convocation, Shirreff Hall, the new women's building for the University, was thrown open for inspection, and tea was served there by the Board of Governors. It will be remembered that Shirreff Hall was erected out of funds provided by the late Mrs. Eddy, of Ottawa. The new Bio-Chemical Building and Dalhousie Health Centre, both nearing completion, were also visited by friends of the graduates and the students, as well as the Science Building, the Law Building, the new Laboratory and the Gymnasium.

QUEBEC

Dr. Narcisse Lacerte, of Levis, has recently celebrated his sixtieth anniversary in the medical profession.

Dr. Giasson, who has been in New York for several weeks, has returned home.

Dr. Albert Paquet, who has been spending some weeks in New York and Chicago, has returned.

Dr. P. P. Gagnon has returned from a several months' trip to Europe.

Dr. J. E. Leblanc, of 491 DeMontigny Street, Montreal, died last month at the age of sixty-nine years.

Dr. J. A. Ranger, director of the Provincial Hygiene Service, gave a lecture recently on venereal diseases, which was well attended.

Dr. J. A. Dubé has removed from St. Quentin, Restingouche, to Buctouche, N.B. where he will continue his practice.

Acting like soldiers on parade and offering not the least trouble, some 250 male inmates of the Ste. Anne Hospital for the Insane, Baie St. Paul, were marched out of the building at two o'clock in the morning when the north wing of the institution in which they were located was completely destroyed by fire, involving a loss of \$150,000.

While the general situation at Mansonville is reported as improving, the typhoid epidemic has claimed its fourteenth victim.

Dr. Lesage, of Pointe Claire, died recently after a long illness. He had been practitioner in that town for twenty-seven years and was noted for his good work among the poor.

Dr. Henri A. Lafleur, of Montreal, has been nominated by the Governor General of Canada, to succeed the late Sir Thomas George Roddick on the Medical Council of Canada.

A new medical society, called the Montreal Clinical Society, has been recently formed. The following officers were elected: *President*, Dr. Norman Viner; *Vice President*, Dr. M. Rabinovitch; *Secretary-Treasurer*, Dr. Nathan Freedman; *Executive Committee*, Drs. S. Ortenberg, S. Eidlow, C. J. Gross, A. P. Ship and D. L. Mendel.

McGill University is sending a cordial address of congratulation to St. Bartholomew's Hospital on the forthcoming celebration of the eight hundredth anniversary of its foundation. The address will be conveyed by Dr. S. E. Whitnall, Professor of Anatomy at McGill, who will be the official representative of the university at the celebrations. The address, beautifully inscribed in Old English lettering on parchment and bearing the scarlet official seal of McGill, is the work of Professor Henry F. Armstrong, Associate Professor in McGill University.

Dr. Robert Wilberforce Mitchell, a well-known physician practising at St. Lambert, Que., for the past twenty-five years, dropped dead suddenly; he had been suffering from heart disease for the past few years, and knew that the end would come suddenly. He often told his friends that he expected to die some day while he was carrying out his duty. His sudden death came as a great shock to all his patients along the South Shore, where his kindness and geniality had brought him a host of friends. He leaves a widow and one son, Arnold Mitchell, at present a student in the dental faculty at McGill University.

The official announcement will soon be made by Bishop Gauthier of the opening of a campaign to raise the sum of \$1,000,000 for the combined objects of rebuilding on a site in Notre Dame de Grace, the Hospital for Incurables, recently destroyed by fire, and of constructing, on the same grounds, an anti-tuberculosis hospital. The Sisters of Providence already have the grant of \$150,000 given by the Provincial Government for the anti-tuberculous hospital, which was to have been constructed at Mont Lasalle, Maisonneuve. The Government has agreed to maintain this for the new, and more satisfactory, project now being put forward.

Dispensaries for the treatment of people suffering from tuberculosis in Quebec will shortly be established

throughout the province, following a decision to that effect by the provincial Board of Health. The points where these dispensaries are to be established will be chosen with regard to the prevalence of the disease in that district. The scheme received the approval of the Hon. Athanase David, previous to his departure for Europe. The dispensaries will be located in hospitals already established, or in other institutions, as the Government does not intend to erect buildings of its own. School dispensaries are to be established, where nurses and doctors will be trained, in Montreal and Quebec. Later, this part of the scheme will probably be extended to other parts of the province.

St. Jean de Dieu Hospital for the Insane, celebrated its fiftieth anniversary recently. The care of the insane under the auspices of a religious corporation goes back as far as 1793, in which year, for the first time, the city made special provision for the care of its insane, by entrusting its work to the Grey Nuns. They relinquished this work, however, in 1844. Thirty years later, in 1873, the work was again taken up by the Sisters of Providence at the instigation of the Provincial Government, and the present hospital was established. At the first, the St. Jean de Dieu Hospital cared for all the insane of the city; the separation of the Protestant from the Catholic insane took place in 1890, when the first patient was received at the Protestant Hospital for the Insane at Verdun.

ONTARIO

MEDICAL ALUMNI ASSOCIATION

At the first Annual Meeting and Banquet of the Medical Alumni Association, University of Toronto, held in Windsor on the evening of Thursday, May 31st, at the Prince Edward Hotel, one hundred graduates of Toronto, Trinity and Victoria were present, and the gathering was marked by the deepest interest, groups of former college class-mates recounting incidents of former and recent times.

The President proposed the toast to the King. Dr. H. R. Casgrain, of Windsor, proposed the toast to the Alma Mater and this was responded to by Dr. B. D. Harrison, Detroit; Dr. J. B. Kennedy, of Detroit; Dr. P. A. Dewar, Windsor; and Dr. George Young, Toronto.

The report of the Nominating Committee was brought in during the evening and was unanimously adopted as follows: Hon. President, Dr. A. Taylor, Goderich; President, H. B. Anderson, Toronto; Secretary-Treasurer, Harley Smith, Toronto; Vice-Presidents, B. D. Harrison, Detroit; A. Moir, Peterborough; Wm. Macdonald, Windsor; J. N. Gunn, Calgary; R. H. Parent, Ottawa; A. D. Smith, Mitchell; A. A. Shepard, Sault Ste. Marie; R. T. Noble, Toronto; E. Davey, Hamilton; S. Stewart, Thamesville; Executive Committee, J. W. McCullough, Toronto; H. A. Bruce, Toronto; F. Marlow, Toronto; F. A. Cleland, Toronto; W. J. Macdonald, St. Catharines; J. W. Rutherford, Chatham; G. Stobie, Belleville; Hon. Dr. Manion, Fort William; D. Smith, Stratford; A. S. Tilley, Bowmanville; G. W. Ross, Toronto.

THE MEETING OF THE ONTARIO MEDICAL ASSOCIATION

The Forty-Third Annual Meeting of the Ontario Medical Association took place in Windsor on May 29th, 30th, 31st and June 1st, 1923. The first day was devoted entirely to business. A few figures in this connection are worthy of note. The business sessions lasted from 9.00 a.m. to 6.00 p.m., The Board of Directors and members of the Committee on General Purposes in attendance numbered 74; while the number of printed reports dealt with amounted to 23. At 7.00 p.m. on the

first day, 98 members sat down to the Round Table Dinner, which was followed by a three hour Round Table Conference, presided over by Dr. A. J. Grant, of London, and at which 41 gentlemen spoke. The evening was pleasant and instructive. A great many problems of general interest to the medical profession were discussed. This Conference must be regarded as one of the most excellent features of the Annual Meeting.

The scientific sessions which occupied Wednesday, Thursday and Friday, were altogether successful. In all sections, 75 contributors presented papers, of whom 65 were Canadian practitioners; the great majority of this number being resident in Ontario. Dr. F. G. Banting gave the address in Medicine; Dr. F. W. Marlow, the address in Gynaecology; Dr. L. J. Austin, the address in Surgery.

The Association Dinner which was held on Wednesday night, was attended by upwards of 300. The Presidential address of Dr. Secord, of Brantford, of which we present an abstract in this number, was the main feature of the programme.

On Thursday afternoon, the entire Convention were the guests of Messrs. Parke Davis & Company for a four hour boat ride, which was thoroughly enjoyed. Thursday evening was given over to Alumni and Class reunions. Reports from all of these functions indicate that the various groups thoroughly enjoyed the evening. Among the outstanding and pleasant features of the Convention were the noon-day luncheons, the Rotary Club, Kiwanis Club and Border Cities Chamber of Commerce being hosts on the three days.

The Essex County Medical Society, under whose auspices the Association met, is deserving of the highest praise for the excellent manner in which the details of the meeting were arranged and carried out.

A *resumé* of the important business transacted at the meeting will later be published in the Journal. The Board of Directors elected for the ensuing year is as follows: President, Dr. J. F. Argue, Ottawa; 1st Vice President, Dr. Geo. S. Young, Toronto; 2nd Vice President, Dr. John Macgregor, London; Hon. Treasurer, Dr. G. Stewart Cameron, Peterborough; Secretary, Dr. T. C. Routley, Toronto. Counsellors: Dr. A. J. Grant, London; Dr. Weston Krupp, Woodstock; Dr. T. H. Middlebro, Owen

Sound; Dr. F. W. E. Wilson, Niagara Falls; Dr. Robert T. Noble, Toronto; Dr. E. A. McQuade, Trenton; Dr. L. J. Austin, Kingston; Dr. Hugh Laidlaw, Ottawa; Dr. Edgar Brandon, North Bay; Dr. J. I. Pratt, Port Arthur. The Forty-Fourth Annual Meeting will be held in Ottawa, in 1924, on the kind invitation of the Ottawa Medico-Chirurgical Society.

Twenty-five thousand dollars has been given to the Toronto General Hospital, Hospital for Sick Children, and to the University of Toronto, by John D. Rockefeller, Jr., for the purpose of prosecuting research in the treatment of diabetes by insulin.

Professor J. J. R. McLeod, of the University of Toronto, will attend the Physiological Conference at Edinburgh on July 24th, and will speak upon the development of the insulin treatment of diabetes. Dr. F. G. Banting will address the British Association of Surgeons in London, on the same subject.

The Western Ontario Academy of Medicine met on April 27th, at the Western University Medical School in London. Dr. Plummer, of the Mayo clinic, spoke on "Disease of the Thyroid," and Dr. Dean Lewis, of the Rush Medical School, Chicago, gave an illustrated lecture on, "The Diagnosis of Bone Lesions." The session was presided over by Dr. Charles H. Harris, president.

Official recognition of the valuable work of Dr. F. H. Banting and of Mr. C. H. Best, was taken by the local Legislature, and Bill was introduced by Premier Drury for the providing of \$10,000 a year to prosecute further research on the Insulin treatment of diabetes. Dr. Banting has been made the professor of research medicine at the University, and Mr. Best, the assistant.

At the convocation of the University of Toronto, on June 8th, a portrait of the late Professor J. J. Mackenzie was unveiled and presented to the University. The portrait will be hung in the pathological building on University Ave. The presentation was made by Mr. I. H. Cameron, and received on behalf of the University by Sir Edmund Walker.

The Ontario Health Officers' Association met in Toronto on May 21st. The members were welcomed by Dr. J. W. S. McCullough, chief officer of the province, and were addressed by Dr. Paul J. Maloney, distict officer of health of eastern Ontario, and Dr. E. R. Secord, of Brantford, president of the Ontario Medical Association. In the meetings which took place on May 21st and 22nd, the cancer problem was discussed, and Dr. Banting spoke on the insulin treatment of diabetes. Mr. S. J. Manchester, director of vital statistics, Registrar General's Department, addressed the meeting on, "vital statistics and cause of death." Industrial hygiene, maternity and child welfare, and venereal disease problems were discussed in the various sessions. Dr. T. A. Lomer, of Ottawa, was elected as president for the following year.

In connection with the meeting of the Ontario Medical Association at Windsor, the writer and other members of the Association wish to register a complaint as to the arrangements made. There has been an endeavour to establish an interest in pathology and bacteriology and the programme contained the details of the meetings of

this section, meetings which were set for Thursday afternoon, May 31st; this was the time set for the river excursion and practically every member of the Association present took advantage of the opportunity offered to see the river fronts; the result was that there was no audience for the pathological section, and little or no audience for the regular section of paediatrics. Members of the pathological staff of Toronto, Queen's, and London Universities had prepared papers for the pathological section, and were very naturally disappointed that the arrangements made deprived them of an audience, nor can one say that they would be unreasonable if they failed to take an interest in subsequent meetings. Complaint might also be made of the arrangements which resulted in an audience of less than a dozen in the sections of medicine and surgery on Friday afternoon, June 1st. The suggestion is made that excursions or gatherings which are likely to take the greater number of the Association away should be left for the last hours of the Association meetings, for it would seem by this time that in a gathering of physicians from all parts of the province, the interest in medicine should precede all else, and we can rest assured that the surest way to discourage our best contributors is to have them appear in a hall kept empty by poor management on the part of the programme committee.

Sir Robert Jones, during his visit to Canada as the guest of the Canadian Medical Association, very generously acceded to the request of the joint Executives of the Western Ontario Academy of Medicine and the War Memorial Children's Hospital of London, Ontario, and gave of his time in the interests of the latter. Due to the efforts of these and other organizations as the Shrine and the Rotary Clubs, a stimulus has been given to the interest taken in the welfare of the under-privileged child who requires orthopaedic treatment. The hospital recently opened is intended, in part, to meet this and these other organizations are contributing their quota. It was to unify these several efforts that this mission was requested of Sir Robert Jones.

On arrival in London on June 14th, he made a brief preliminary inspection of the hospital and then addressed a representative audience at a luncheon. Dr. C. A. Harris, President of the Academy of Medicine, occupied the chair, and in his remarks expressed the thanks of the local organizations to the Executive of the Canadian Medical Association for their courtesy in sharing the privilege of host to the distinguished visitor.

In his remarks Sir Robert paid high compliment to organization for the erection of a hospital by voluntary contribution, and to the beauty of its design and the completeness of its arrangements. It was a worthy monument to noble deeds. Launching into the subject of childhood deformity, the speaker pointed out that in the ideal state when tuberculosis and rickets would have been conquered, many of the deformities would disappear. Prophylactic features of hygiene were stressed and the great need for inspection of the herds that supply the milk.

He referred to the various agencies sponsoring the need of the cripple and made suggestions which, with the vision of an extended experience were very helpful. The value of such auxilliary institutions as convalescent homes away from the hospital where the child's education might proceed both in the direction of physical and mental development, as well as contributory out-patient clinics in various towns in the district, were stressed.

At the conclusion of his speech he invited any interested physicians to accompany him on ward rounds where a number of cases were presented for him to express his views on the treatment of them. The memory of the skill of his demonstrations will long remain with the hearers.



JOHN WALLACE SCANE, M.D.

Obituary

JOHN WALLACE SCANE, M.D.

Few men in the Canadian profession were better known and more generally liked and respected than the late Dr. Scane. For more than twenty-five years on the teaching staff of the Faculty of Medicine of McGill University, during all that time an active and prominent member of the Canadian Medical Association, and for nearly a decade its permanent secretary, he exerted a powerful influence in favour of progress, good fellowship, and the unification of all the provincial associations into one active and strong body representing the profession as a whole.

Dr. Scane was born in Chatham, Ontario, in 1839. His father was a lawyer in high standing. His early education, which was thorough, was received in the public schools of his town. He began the study of medicine in the University of Toronto, but was shortly afterwards attracted to Montreal, and entered McGill in 1889, graduating from it in 1893. On graduation he was offered and accepted the position of house surgeon to the late Dr. James Bell in the Royal Victoria Hospital. This position he held for a year and a half, and on resigning it he commenced practice in the town of Westmount, where he remained about three years, when, owing to the ill-health of his wife, he removed to St. Thérèse, within easy motor ride of Montreal.

The subject of physiology was always a favourite study with him, and in 1896, in order to pursue his studies further, he applied for a demonstratorship in this department under the late Professor Mills, an appointment which he held for several years. In 1900 he went overseas and spent about a year in Germany, studying in its more important hospitals. In 1904, in addition to his work in the department of physiology he was appointed lecturer in pharmacology in full charge of all experimental demonstration work. In 1908 he was offered and accepted the position of lecturer in physiology in the University of Vermont, a position which he held concurrently with that in McGill, until 1913. In 1910 he was promoted to the assistant professorship in pharmacology. From this position he only resigned when Professor Barbour was placed in charge of the whole department. Two years ago the Faculty made him Assistant Dean, and placed him in charge of all the detail work connected with its activities. For many years he was also one of the representatives of the University on the board of the College of Physicians and Surgeons of the Province of Quebec.

As a companion and a *confrère* Dr. Scane enjoyed the confidence of all who knew him, possessing in a high degree the gift of friendship. He was everywhere recognized as a man of good judgment, with much breadth of mind, and kindness of spirit. He was also an excellent musician. Fond of sports of all kinds, he excelled as a golfer and a curler. The following is an excerpt from the resolution passed by the Faculty of Medicine of McGill at their last meeting:

"Dr. Scane has been intimately associated with this Faculty for the past twenty-five years, as a teacher, a medical registrar, and more recently as Assistant Dean. Indeed it may be said that his professional life from first to last has been mainly occupied in a direct service to his own university. Though his work in life has been far too short, it deserves to be measured in the highest terms, for it was ever distinguished by a genuine candour, a marked ability, and by sound judgment. In a conspicuous sense he was especially endowed and walked among us as a man admirably fitted for the position which he filled. From the beginning he exerted a far-reaching influence both by precept and example in the university life. Teacher and student alike regarded

him with genuine affection, and to both he proved himself an ever present help in times of trouble. This academic career was widened and increased by his interest in medical education, and by his activities in the Canadian Medical Association, and in the College of Physicians and Surgeons of Quebec. And so his name came to be known throughout the medical world, and especially in Canada and the United States. To this same world his death now brings a signal loss."

He leaves behind, his widow, a son and two daughters. We are sure that his portrait which we present with this number will be received with pleasure by every member of the Association.

Lieutenant-Colonel William Malloch Hart M.C., died suddenly at Ottawa on April 17th, of peritonitis. The son of the late Professor Hart and Mrs. Hart, he was born in Winnipeg, and grew up there, graduating in Arts in 1902, and in Medicine in 1907. With the handicap of a fragile body, and later, of definite disease, he carried through cheerfully, the work of a strong man. His own illness directed him into large service to others who were ill. He was on the staff at Saranac, organized the Anti-Tuberculosis campaign in St. Louis County and the City of Duluth, and laid the foundations of Nopeming Sanatorium; organized the campaign in Saskatchewan, and laid the foundations of the Saskatchewan Sanatorium. This work he dropped at the very first shot of the War to enlist as a private in a machine-gun section. Later, as medical officer of the battalion in which he had served as private, he was in the front lines with his men in the confusion of the first gas attacks. Isolated with them, and refusing to leave them, and searching for means for their relief, he was taken prisoner. He was the first Canadian exchanged, and soon returned to the West front. Later, he organized the sanatorium and diagnostic centre for Canadians at Lenham, England, and commanded it to the close of the War, doing well a greatly needed work. On return to Canada, he was one of the five consultants to consider all phases of the condition of the tuberculous soldier, his treatment and re-establishment. The main report he had a large share in, and himself wrote the special report on after-care. He was retained at Ottawa as a permanent consultant and advisor with regard to the re-establishment of tuberculous soldiers. For this work he was eminently suited, having ample knowledge of conditions and the sympathy that comes from comradeship in arms. Methodical, persevering, untiring, judicial, fair, and above all, kind, he was just the man for the work. Here at his work, like the gallant soldier he was, death came upon him suddenly, and he passed from us scarcely yet forty-two. Above all else he was the kindest of men, sympathetic, constant, untiring whenever he could help, patient, even under the tiresome recitals of sorrowful details that sometimes are inflicted upon friends. He was straight and fine in all his views of life, and did not know how to be anything but honourable. As we look back upon him, it is his smile we remember, which expressed the essence of the man, his kindness, sympathy, tact, and sparkle of humour. At the same time he was strong in all his purposes. As a commander, he exacted the best service his men could give, with no abatement, but got gladly as a service of love.

Dr. Neil McKendrick died on April 11th, at Placentia, Newfoundland, where he had practised for over forty years. He was one of the original members of the Newfoundland Medical Board and remained a member until two years ago when he resigned on account of ill health. Dr. McKendrick was born in the Province of

New Brunswick about seventy-one years ago, and was a graduate in Medicine of the University of Cincinnati, taking his degree in 1878. His remains were conveyed to St. John's for interment, his funeral being largely attended by prominent members of the medical profession of that city.

Dr. D. E. Mundell former professor of surgery at Queen's University Medical School, died in Kingston on June 11th. Dr. Mundell had been for many years in practice in Kingston and was one of the outstanding men of the medical profession in eastern Ontario. A graduate of Queen's in 1885, he became early associated with the faculty of medicine of his old university, and had been actively engaged in teaching surgery until two years ago. It is hoped that a more complete account of his many activities will be forthcoming in a subsequent issue of the Journal.

Dr. R. W. Bell a veteran of the Fenian Raid, in which he served with the 44th Brockville regiment, died on June 9th, in his 72nd year. A graduate of McGill in 1873, he had practised in Carleton Place and later in Peterborough. After twenty-five years spent as a medical practitioner, he came to Toronto in 1900, and was on the staff of the Toronto Hospital for the Insane.

Dr. May Austen, a graduate of Arts and Medicine of Dalhousie University, and for ten years a medical missionary for the Methodist Church of Canada assigned to the China mission field, died at her home, 352 Robie Street, Halifax, after a prolonged period of ill health, the break in health occurring while at duty in China.

Dr. A. J. DeVeau, of Meteghan, died from typhoid fever on the 9th of June, after four weeks' illness. Dr. DeVeau was a graduate of Dalhousie University, class of 1912. He was medical officer of health for the county of Clare, and was widely and favourably known in that community.

Dr. Charles E. Jarvis of London, Ontario, died suddenly on June 11th, in his 65th year. A graduate of Queen's University in 1882, he subsequently qualified as a homeopathist.

Dr. Daniel Hamilton died at Harriston on June 2nd, in his 86th year. He was one of the early settlers in the Harriston district, and had practised there for sixty years.

Dr. F. F. Bell died at Windsor on June 10th, in his 75th year.

Book Reviews

History of the Great War—Medical Services, Diseases of the War Volume II. Edited by Sir W. G. Macpherson, K.C.M.G., Colonel T. R. Elliott, C.B.E., D.S.O., F.R.S., and Lieut-Colonel Andrew Balfour, C.B., C.M.G. London: H.M. Stationery Office or through any bookseller, 1923. Medium, 8vo., pp. viii, 621; 7 coloured plates and other illustrations, 6 maps. Price, £1, 5s. net. Canadian Agents: The British Commonwealth Publishing Company, 61 College St., Toronto.

The first volume of the "Diseases of the War" was reviewed in the February number of the Journal. This second volume devotes about seventy pages to neurasthenia and war neuroses, fifty pages to skin diseases, forty pages to venereal disease and fifty pages to medical aspects of aviation and its diseases. The remainder of the volume, some three hundred and forty pages, deals with gas warfare, with a short chapter on medical problems in tanks and in mine warfare. It is an interesting statement that, in February, 1921, the total of men drawing pensions for neurasthenia and allied disabilities, was 65,000, a number not greatly below the total of casualties estimated as having been admitted to medical units during the war.

Though skin diseases are looked upon as minor maladies, their collective results show an enormous weakening of the man power of the army, particularly in conjunction with trench fever, which we now know is transmitted by body parasites. In one army in France, in the latter stages of the war, it is stated that the more common diseases were scabies, infections of the skin, and pyrexia of unknown origin, the latter made up principally of trench fever. These conditions accounted for ninety per cent. of all the sickness in this army. For the treatment of scabies, the most satisfactory procedure was found to be thorough rubbing with soft soap for fifteen minutes, then a warm bath for twenty minutes; during the last five minutes the infected sites to be gently scrubbed with a soft brush. After drying, sulphur ointment (B.P.) is to be rubbed over the whole body below the neck. This injunction is to be repeated on the second and third days, and on the fourth day, but not before, a second

warm bath to be given, and then clean clothing and bedding supplied.

It is stated that the number of cases of venereal disease treated from August 4th, 1914, to the Armistice, numbered about 400,000, of which gonorrhoea formed sixty-six per cent. and syphilis twenty-four per cent. The rates for the whole British Army including Dominion forces, compared favourably with the rates for the three previous peace years, varying in the different war years from 37 to 52 per 1,000 per annum for all British troops, while during the peace years 1911-13, the rates were 51 to 60. The Canadian forces showed a higher rate while in Britain, reaching 222 per 1,000 in 1915, 209 in 1916, 114 in 1917 and dropping to 82 in 1918. The questions of prevention, personal prophylaxis, ablation stations, abortive treatment and disposal of cases are fully discussed. Under treatment attention is given to the various measures adopted in different centres and an attempt is made to compare their relative efficacy. The experimental work on different arsenical preparations is recorded and there are three pages of general conclusions.

The chapters on gas warfare detail the principal attacks and these are illustrated by excellent maps. The gases used are classified under the headings, acute lung irritants, lachrymators, paralysants, sterutators and vesicants. When Germany threw discretion to the winds and adopted a method of warfare contrary to its pact at the Hague Convention and repugnant to the Nations who believed in observing a code of honour in warfare, they were in a position to secure enormous supplies through their great dye and chemical works. Britain in common with the French, had neglected the dye industry and had little or no experience in the commercial production of even the precursors of the organic poisons used. Phosgene was not manufactured in England before the war. By the end of 1915, England had produced 860 tons of gas and in 1917 alone, 18,500 tons. To the Germans is given credit for their skill in developing the offensive side of gas warfare, gaining a long lead in the design and production of gas shells, but the British held the leading place in defensive measures, the successive alterations in the British respirator keeping constantly ahead of the German offensive developments.

The symptoms, pathology and treatment of gas poisoning are fully presented and there is a bibliography appended to each chapter.

Pneumonia is one of the diseases which receives no mention except as a complication of influenza and tuberculosis is not mentioned in either volume. J. H. E.

Gonorrhoea—A Monograph On. By A. Reith Fraser, M.D., (Aberd.), Lecturer in venereal diseases, University of Cape Town, Major S.A.M.C., formerly Medical Inspector of Venereal Diseases, South Africa. Large octavo, pp. xvi + 508, 56 illustrations and 49 plates. 1923. London: Henry Kimpton. Price, 18s. net.

The author presents a complete treatise upon the subject of gonorrhoea and its complications. Gonorrhoea in the female (the upper limit of his field is the cervix) and in children, are treated as within the field of the venereologist. It is insisted that it is utterly impossible to sterilize the infected urethra by means of antiseptics now at our disposal, and a plea is made for conservative treatment and management of the infection as a systemic disease instead of as a localized specialized catarrh. The teaching is from personal clinical observation, with judicious use of the literature of the subject which may be classed as either accepted, speculative, controversial or experimental. The author is not enthusiastic about the value of the "ingenious 'scopes' for peering into the human vitals" which are now so popular, and questions the value to the untrained observer of the custom of reproducing "urethroscopic pictures of artistic colour and intriguing design."

The work is complete in detail and each chapter has in addition to a summary of its contents, an appended bibliography covering the matter presented. A valuable feature is a general index to these bibliographical references. There is as well an index to the names appearing in the text, and a copious general index. The chapter on the history of gonorrhoea is, perhaps, too concise, but is well written, and reference should be made to the chapter on the literature of gonorrhoea, which forms a splendid guide to the student. He gives a good summary of procedures, the value of which has not yet been generally accepted, such as complement fixation test. We have discovered numerous unimportant typographical errors in the text, but these do not detract from the value of the work, which may be looked upon as a masterly monograph. J. H. E.

Text-Book of Ophthalmology Fuchs, edited by Duane. Seventh American edition. Lippincott.

The average life-time of man does not measure the years that "Fuchs" has stood as a guide for students in Ophthalmology. Now comes the seventh edition in America, well measuring up to the high standard set by its predecessors.

Some changes in the arrangement of the subjects discussed have been made, and though these make for greater convenience in a search, the point of chief importance is that, in the re-writing of so much of the text, full cognizance has been taken of all the recent investigations in ophthalmology, so that one may depend upon finding discussed those advances, which are by experience proven trustworthy. Indeed, this new edition will hold its place as the outstanding authority in the specialty.

There is no division of the old book which has not been carefully gone over, and revisions made where the editor deemed necessary. Especially is this so in the chapter on motor anomalies, in which Duane is so personally interested. Also the chapter on the surgery of the eye-region, has been revised and enlarged, so that in every way the volume deserves its title.

The attempt to keep the text as much as possible as it was originally set down by Fuchs himself, is very creditable to the editor. Altogether, one can hardly conceive how a more satisfactory compilation of all that is dependable in this branch of medicine could be made.

The book-making is of the very best; paper and print-

ing perfection, so that reading is easy. The addition of so much new material to the successive editions is making the volume a heavy one, so that we expect some day to see our old friend and guide appear in two volumes.

E. C. T.

The Heart in Modern Practice; Diagnosis and Treatment By William Duncan Reid, A.B., M.D., Chief of the Heart Clinic, Boston Dispensary. Large 8vo., pp. 352, 32 illustrations. 1923, Philadelphia and London, J. B. Lippincott Company. Price, \$5.00.

The author's excuse for the appearance of this book is that he is aware of no single book in English which is suitable to recommend to the student or physician who asks for the name of a single volume which covers the subject of the heart in health and disease. The chapters on anatomy and physiology are sketchy, but serve as a review of the important considerations in these departments. Heart disease is treated from three view-points, etiological, structural and functional, rather than from the view alone of the pathology of the structures involved. About one-fifth of the main part of the book is taken up with case reports which appear as an appendix. The general make up of the book is not attractive. Thick paper, large type and wide spacing add unnecessarily to its bulk. J. H. E.

American Illustrated Medical Dictionary. (Dorland).

A new and complete Dictionary of terms used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, Veterinary Science, Nursing, Biology, and kindred branches; with new and elaborate tables. Eleventh edition, revised and enlarged. Edited by W. A. Newman Dorland, M.D. Large octavo of 1229 pages, with 338 illustrations, 141 in colours. Philadelphia and London: W. B. Saunders Company, 1922. Flexible Leather, \$7.75 net.; thumb index, \$8.75 net. Canadian Agents: The J. F. Hartz Company, Limited, Toronto, Ont.

This is a reprint of the Eleventh Edition which appeared in 1921. The demand for this dictionary is indicated by the necessity for a new edition about every two years with numerous reprintings in the period since its first appearance in 1900. This edition is a revision of that of 1919, and is said to contain some 1,500 new terms, many of which have been added in the fields of biologic chemistry, endocrinology, immunology and neurology.

The typography is excellent for a work which contains so much in its 1,200 pages. Its scope is pronunciation, derivation and definition of the words and terms used in medicine and allied sciences. It includes eponyms, operations, signs and symptoms, as well as methods of treatment. A volume which has made such a place for itself in the physician's library needs no recommendation.

J. H. E.

Green's Manual of Pathology and Morbid Anatomy.

Bosanquet and Wilson. Thirteenth edition. Revised and enlarged, 1923. Published by Bailliere, Tindall & Cox, London, England. Quarto, 600 pages.

As stated in the preface, this text book has attained its jubilee, the original edition having appeared in 1871, at which time it constituted the first systematic introduction to the English student of the cellular pathology associated with the name Virchow. The book is well written, well illustrated, and contains in addition, several beautiful, coloured plates. Plates dealing with the blood and its disorders are particularly well done. Part I, on general pathology, contains excellent chapters on "nutrition," affections of which constitute so much of our pathology: "nutrition arrested" is necrosis, "nutrition impaired" is atrophy or it may be cloudy swelling or fatty degeneration, or further, mucoid, colloid or hyaline degeneration. Three chapters on parasites, metazoan, protozoan and vegetable are exceedingly well written

and illustrated. The chapter on immunity is so written that it is easily appreciated, something difficult to say of most descriptions of this interesting subject.

Part II is given up to the diseases of special tissues and organs. One may note in passing that the old classification of diseases of the kidney is still retained, and that there is an exceptionally good chapter devoted to diseases of the nervous system.

Clearly printed on good paper and with every evidence of care in the process of its revision and editing, the book can safely be recommended as a text book for students or as a handy book of reference for the older practitioner.

N. B. G.

Exercise in Education and Medicine. By R. Tait McKenzie, M.D., LL.D., Professor of Physical Education and Physical Therapy and Director of the Department of Physical Examination, University of Pennsylvania. Third Edition. Octavo of 601 pages, with 445 illustrations. 1922, Philadelphia and London: W. B. Saunders Company. Toronto: The J. F. Hartz Company, Limited. Price, \$5.00.

The first edition of this work appeared in 1909, the second in 1915. This new edition includes the results of the author's experiences as Physical Training Officer and Inspector of Physical Therapy in the armies of Britain, Canada and the United States. He has made note also of the development of physical education in school programmes as a result of the revelation of physical debility and disability observed at mobilization and draft depots. The volume is divided into two parts, Exercise in Education, and Exercise in Medicine. Following a classification of exercises, several chapters are devoted to the physiological effects of exercise upon the muscles, lungs, heart and nutrition with particularly good chapters upon the estimation of heart efficiency and the effects of exercise on the heart. The various systems of exercise are outlined and their special applications evaluated. Physical education and competitive athletic sports both mass and individual, as carried out in camps, playgrounds, schools, and colleges are detailed in such a way as to make the work a guide to teachers and directors whether dealing with boys or girls. He has rendered special service in pointing out what can be done for mental and moral defectives, for the blind and for deaf mutes.

In the second part of the book he deals with the application of exercise to pathological conditions, devoting a chapter to massage and vibration, another to mechanical means for massage and muscular re-education. In the latter chapter are found several illustrations of the apparatus developed under the direction of Professor A. E. Bott in the Military School of Physio-Therapy at Hart House. There is much on the orthopaedic application of various exercises and apparatus for the correction of such conditions as flat foot, club foot, stooped and uneven shoulders and scoliosis. The more purely medical conditions such as visceroptosis, constipation, respiratory and circulatory diseases, obesity and exhaustion are treated in such a manner as to make the work one of great value to the general practitioner as well as to the physical director. The work should make a wide appeal to school boards, and all directorates of institutions devoted to education, to the care of the crippled and deformed both mental and physical. The illustrations in both parts of the work are excellent and add a most useful feature to a book of great merit.

J. H. F.

The Diagnosis and Treatment of Heart Disease: Practical Points for Students and Practitioners. By E. M. Brockbank, M.D., Viet., F.R.C.P. Cr. 8vo, pp. xi, 232, 22 figures and 3 plates. London: H. K. Lewis & Company, 1923. Price, 6s.6d. net.

Five editions in eleven years speaks well for the popularity of this small book on diagnosis and treatment. The fifth edition has rapidly followed the fourth. The author has made many changes and additions. The book though still small, contains some seventy added pages. A most useful chapter is that on practical points in the

treatment of cardiac disease, where the general management of the case receives equal consideration with medicinal treatment. The added chapter on life insurance examination in relation to heart disease and altered function, should be helpful to the young practitioner with little experience in his work.

Not only is it an excellent book for students, covering succinctly as it does the general principles and practice of medicine in cardiac disease, but it should appeal to the general practitioner who will find many helpful suggestions.

J. H. E.

Carriers in Infectious Diseases. By Henry J. Nichols, M.A., M.D., Major M.C., U.S. Army, Assistant Professor in the Army Medical School, Washington, D.C. With a section on Carriers in Veterinary Medicine, by R. A. Kelsner, D.V.M., M.A., Captain, Veterinary Corps, U.S. Army. 184 pages. Baltimore: 1922, Williams & Wilkins Company. Price, \$3.25.

The author makes an attempt to give a systematic discussion of the carrier problem as related to medicine and surgery. As Assistant Professor in Bacteriology, Parasitology and Preventive Medicine, he has had to approach these problems from both academic and practical viewpoints. His army service has included the investigation of the origin of several epidemics where the carrier possibility had to be borne in mind, and during the war he had numerous opportunities to test the results of treatment of carriers both through clinical observation and by means of laboratory study.

The work is based upon his personal experience and a study of the literature available in the Surgeon-General's Library. The author refers to the text by Ledingham and Arkwright and that of Simon and points out that the present volume is intended to supplement them.

The author suggests the term *phorology* as a suitable designation for the science and art which deals with the carrier in relation to disease. He classifies the carrier into (a) incubationary—those who are infected, and infective individuals in the incubation period of a disease, and points out these are temporary carriers, (b) convalescent carriers—those convalescing from an infectious disease and who may be temporary, chronic, or relapsing carriers, and (c) contact carriers—healthy persons, those who acquire the parasite from association with carriers or patients without developing the disease themselves. These are immune persons. These may be temporary or chronic carriers and are classed as primary or secondary as they receive their parasite from a case or from a carrier.

The book is a manual rather than an exhaustive study. It is a practical guide for the physician, the health officer as well as the student. The references are principally to the American literature. Fifty pages are devoted to the animal carriers of those organisms pathogenic for both man and animals, including some forms possibly pathogenic for both and a group of organisms pathogenic for animals only. This is probably the first time a work has been written upon this subject. In this collected form it will prove of great practical value.

J. H. E.

Handbook of Sanitary Law. By B. Burnett Ham, M.D., D.P.H. Ninth edition, pp. 244. London: H. K. Lewis & Co., Ltd., 1923.

This little book is intended mainly for the use of (English)—(reviewer's emendation) medical students desirous of taking the Diploma of Public Health.

Much of the subject-matter in the textbooks on hygiene and public health is scattered and difficult of access. An attempt has been made in this small manual to collect and condense under various headings the whole of the law bearing upon the public health as applicable to England and Wales. The London Act has also been added for the purposes of reference and comparison. In reducing the clauses of the Acts to a simpler and less complex form, every care has been taken to preserve the strict and definite legal meaning of the original statutory text."

The style and arrangement of this handbook seem admirable for its purpose—a condensation and correla-

tion of the English laws, statutes, ordinances and regulations on every aspect of public health.

Excellent for the English student of English public health law, and for the Canadian student of comparative legislation, it is of little practical value to the Canadian student of Canadian law, since most of it is "not applicable" in this country, or requires that any applicability it has should be demonstrated by showing that Canadian laws, etc., are identical with those of England, in each given case. Since to accomplish this proof of applicability of English law involves discovery of what the Canadian law is first, and since, having ascertained the latter, the former is no longer of practical interest, it is difficult to see that this book can be of much value to D.P.H. students in this country except for occasional reference on points of academic interest. It is well printed and indexed.

H. W. H.

Anaemia; Its Causes and Modern Treatment. With a chapter on Neurasthenia. By A. W. Fuller, M.D., Edin. Pages, 64. Cr. 8 vo. London: H. K. Lewis & Company Ltd., 1923. Price, 3.6d. net.

We can do nothing but condemn a book on anaemia in which the author is so ignorant or so careless as to state that the leucocytes in normal blood number about 1,200 per cubic centimeter, and that the red cells in health number about 5,000,000 per cubic centimeter. Throughout the book he records the counts in cubic centimeters when it should read cubic millimeters.

That part of the book dealing with the causes of anaemia is lamentably weak, while the treatment and results read like the literature of a charlatan or nostrum vendor. The whole object of the book appears to be to laud a certain injection. He states on page 32: "Colloidal forms of iron and manganese can be given by injection, but a combination of iron, arsenic and strychnine will be found to yield the best results. Many of these injections give a certain amount of pain, but the writer has found one that is absolutely painless. It consists of the last-mentioned medicaments in solution in isotonic serum. This can be given to a nervous patient without the least apprehension, and by adopting the auxiliary lines of treatment detailed above, a good result is invariably achieved," and there he leaves the reader. Apparently one can get this remarkable remedy only from the writer personally. From his statement that his treatment "should appeal to all, especially to business men" we are led to infer that the book is written for the laity rather than for the physician, advocating as it does a preparation of his own, the composition of which is not announced to the reader. This inference is strengthened by the word tachycardia being explained to the reader as rapid heart beat, the latter appearing in brackets following the former.

J. H. E.

Notes on the History of Military Medicine. By Lieutenant-Colonel Fielding H. Garrison. Large octavo of 206 pages. Washington: Association of Military Surgeons, 1922. Paper: Price, \$1.50.

This volume is a reprint of a series of articles which appeared in *The Military Surgeon* during 1921-22. Garrison's name bespeaks research and authority. With the resources of the Surgeon-General's Library at his command he has made an exhaustive study of the literature bearing upon his subject. The result is a comprehensive survey of military medicine from antiquity with bibliographical notes and references. For the first time there is made available for the student, or for the officer who wishes to write, lecture, or study, not a bare list of authorities, but a commentary on the literature, by which further research is made possible.

Following the chapters on Antiquity, Greece, Rome, and the Middle Ages, the Sixteenth and succeeding centuries are discussed in separate chapters. The chapter dealing with the Sixteenth Century opens with a quotation from President Lowell, of Harvard. "It is hardly an exaggeration to summarize the history of four hundred years by saying that the leading idea of a conquering nation in relation to the conquered was, in 1600, to change their religion; in 1700, to change their trade; in 1800, to change their laws, and, in 1900, to change their drainage."

Colonel Garrison has succeeded admirably in writing an outline of military medicine, which, though a valuable work of reference to the bibliographer, is as well an intensely interesting and readable story of the gradual development of medicine as applied to armies whether on peace footing or in the field. He points out that preparedness means preparedness to maintain peace as well as to make war, that with the awful possibilities of chemical, electrical and pathogenic agents in future wars the service of the Medical Department will be of even greater value.

J. H. E.

International Clinics. Thirty-third series, volume 1, 1923. Edited by Henry W. Cattell, A.M., M.D., Philadelphia, U.S.A., with Medical and Surgical Collaborators in United States, England and Canada. J. B. Lippincott Company, Montreal. Price, \$2.50 per volume or \$10.00 for the series of four.

We miss the familiar name of H. R. M. Landis on the editorial page, but the name of Henry W. Cattell is a promise that the high standards set by the retiring editor will be maintained. The departments appearing in this number are Medicine, with diagnosis and treatment, Paediatrics, Gynaecology and Obstetrics, and Surgery, with two border-land topics, The Medical Man in Politics, and on the Ethics of Pharmacy.

Neurology is well represented in several sections. Thayer's article on prognosis and treatment in angina pectoris has the place of prominence it well deserves, but there are many others of equal merit, such as the three succeeding papers on diseases of the digestive tract. Professor Dorland's practical hints from office experience in gynaecology may be read with profit by every general practitioner, and not the least valuable part of his paper is that dealing with birth control. The article on the management of a radiological clinic should offer helpful suggestions to hospitals installing such facilities.

The volume closes with a review of the advances in medicine and surgery during the past year to which is added abstracts of some of the more important surgical papers.

J. H. E.

The Trial of Mary Queen of Scots. (1586). Edited by A. Francis Stewart. Octavo of 184 pages, 7 illustrations. Toronto: Canada Law Book Company, 1923.

This is a further volume of the "Notable British Trials" series. The introduction gives a short outline of the life of the unfortunate Queen. The procedure of the State trial is given in full, the first formal trial of a crowned sovereign in historic times. The legal processes which led up to Mary's imprisonment and trial are well detailed, as are the battles of the English lawyers and an account of her last days of misery borne with dignity and bravely. This volume has not the medico-legal interest of many of the series, but is none the less interesting as a history of the famous trial.

J. H. E.

The Successful Physician. By Verlin C. Thomas, Visiting Physician of the Franklin Hospital, San Francisco. W. B. Saunders Company, 1923.

It is hardly fair that a work dealing with certain standards of the West should be judged by a conservative reviewer of the East. What to us for instance may seem an innovation, such as physicians' office buildings and certain modes of advertisement, is perhaps to the West the established mode of existence. The success of the physician in Dr. Thomas's book in any way save a material way is but lightly touched upon, it is admitted that you must know your work and must develop personality; sincerity, integrity, loyalty are described and are recognized as necessary for successful practice (perhaps some insistence on these points is necessary, there may be graduates in any school who have successfully evaded the forces of example) but it grates to read such sentiments as appear on page 27 concerning the choosing of one's friends, and to see paragraphs actually warning us that we should only choose as friends those who are likely to be of material use to us. The fine force of an ethical standard is seen in pages which deal with advertising, and the young

physician is advised that it will not pay to advertise on the theatre programme because the actors' union are likely to have their own doctor. The suggestion that one should deliberately cultivate the acquaintance of Pullman car conductors, porters and hotel clerks, purely with the idea of having them refer patients to one would certainly interest this class of humanity if they could know that we looked on them merely as touts for our business. To the reviewer it seemed a sad thing that work of this sort be considered in any way necessary, but perhaps his ideas or ideals have not kept pace with the times. From the references, quotations and authorities one gathers quickly that the efficiency experts have had a large influence in the thought which has produced this work and if medical practice is to be considered as purely a matter of business the Successful Physician may well be in the hands of men who feel that way; to copy a well known criticism, "those that like that sort of a thing will like this sort of a book."

N. B. G.

Rest and Other Things, a Little Book of Plain Talks on Tuberculosis Problems. By Allen K. Krause, A. M. M.D., Associate Professor in Medicine and Director Dows Tuberculosis Research Fund, Johns Hopkins University. Small 8vo, 159 pages. Baltimore: 1923. Williams and Wilkins Company. Price, \$1.50.

This little volume of eight essays and addresses is made up from six which have appeared in *The American Review of Tuberculosis*, and two others from the *Journal of the Outdoor Life* and the *New York State Journal of Medicine*. Krause needs no introduction to the medical profession. As an Assistant Professor in Johns Hopkins University, as director of a tuberculosis research laboratory, as an editor, essayist and speaker he is well known. We have prized these essays since their appearance as reprints. They should have been made available in book form earlier. We welcome them now for their great value to the practitioner, the teacher and the tuberculosis worker. The essays are plain talks full of concentrated wisdom. Two deal with the rationale of rest, and these should be read by everyone who has to deal with a patient under treatment. Two on childhood infection and its relation to adult pulmonary tuberculosis make clear our present conception of the entrance and spread of tuberculosis, the steps which may lead from infection to the clinical manifestations of disease. Two on the tuberculosis problem and the method of attack are followed by a discussion of the problem of medical education in tuberculosis.

With the companion volume, uniform in size and price, *Environment and Resistance in Tuberculosis* we have a good summary of the belief of this great teacher and investigator. Careful reading of these two volumes by the audience to which they are addressed will go far to clarify our conception of tuberculosis as an infection, as a disease and as a public health problem, and will go far to aid the reader in his work of healing the sick, of prevention of disease and of aiding in lessening the incidence of tuberculosis.

J. H. E.

The Chemistry of Tuberculosis. By H. Gideon Wells, M.D., Ph.D., Professor of Pathology, Lydia M. DeWitt, M.D., A.M., Associate Professor of Pathology, and Esmond R. Long, Ph.D., Assistant Professor of Pathology, University of Chicago and Rush Medical College. Cloth, 438 pages, 6 x 9. Baltimore: Williams & Wilkins Company, 1922. Price, \$5.25 post paid.

This book is stated to be a compilation and critical review of existing knowledge on three subjects (1) the chemistry of the tubercle bacillus and its products, (2) the chemical changes and processes in the host, and (3) the chemical aspects of the treatment of tuberculosis. For some twelve years the Otho S. A. Sprague Memorial Institute, of which Dr. Wells is director, has been carrying on research work in the chemotherapy of tuberculosis. The collecting and reviewing of the literature on the subject for their own use made this volume possible. Students of tuberculosis whether clinical or laboratory

owe a debt of gratitude to the authors for making the subject matter of this monograph available. So thorough has been the work that the authors believe it will be possible to find in this book whatever has so far been learned concerning any chemical problem which may come up for consideration. It is their intention to keep the subject matter up to date in new editions if called for.

Considerable space is devoted to the chemistry of the tubercle bacillus itself, its waxy envelope and to tuberculin, including the metabolism of the bacillus and a discussion of its acid-fastness. Other acid-fast bacilli are also considered.

Under the heading of chemical changes in the host there is much relating to necrosis, caseation and the substances found in tuberculous tissues including analysis of calcified deposits, lung stones and pneumokoniosis. The chemistry of the blood, of effusions and of the sputum is well treated, while metabolism requires nearly fifty pages for its presentation.

Both the clinician and the laboratory worker will be interested in the third section of the book which treats of chemotherapy. It is pointed out that the anatomical changes of tuberculosis have been long and carefully studied from a morphological standpoint, yet such changes are associated with chemical changes in the tissues, blood lymph and body fluids in the excretions and the secretions including those of the ductless glands.

There is a rather detailed account of the experimental work which has been done in an effort to develop a specific chemotherapy. Chemotherapy is defined in a general sense as the treatment of a disease by the use of any drug or chemical. Dye therapy, creosote, guaiacol, cinnamic acid, cod-liver oil and other fats and fatty acids among the organic substances, arsenic, copper, gold, mercury and iodine among the inorganic substances, are well reviewed. Calcium therapy also receives due notice.

The references to the literature appear conveniently as foot notes.

J. H. E.

Pathological Histology. By Gustave Roussy and Ivan Bertrand. Translated from the second French edition by Joseph McFarland, M.D., Sc.D., Professor of Pathology and Bacteriology, University of Pennsylvania. Lea & Febiger, Philadelphia and New York, 1922.

From its artistic, embossed leather binding to the last letter of the index, this small work of 270 pages does credit to its authors, translators and publishers. In the short preface of the translator it is stated that the book is novel in almost every particular, and has no parallel among the books offered to students of medicine. While not professing to take up all histology, it is yet a guide to the microscopical study of morbid tissues, 124 excellent plates are given, (all placed on the right hand pages): short descriptions, the normal histology of every organ are given (in some cases with plates) and the pathology is then considered under the terms of diagnosis of the organs and diagnosis of the lesion.

The book seems particularly well arranged for the student. A short introduction on the microscope, the elementary principles of technique, and the short descriptions with the engravings seem excellently suited to the purpose of teaching the beginner the ground plan of pathological histology.

N. B. G.

How We Resist Disease. By Jean Broadhurst, Ph.D. Illustrated with 138 engravings and 4 colour plates. Published by J. B. Lippincott Company, Philadelphia and London, 1923.

This is a small book of 212 pages, well printed and profusely illustrated, written with a view to satisfy the needs of general college students and nurses who have but a limited time to devote to the study of immunity. The author in a simple and interesting way has well presented the outstanding and important portions of the subject of immunity. The first chapter of forty-three pages is devoted to a summary of the main effects of bacterial action on tissues. The author pre-supposes that the student has an elementary knowledge of bac-

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teria and does not allot any space to bacterial study. The remaining chapters deal in turn with a concise, but to the point, discussion of active and passive immunity, toxins and antitoxins, agglutinins and precipitins, opsonins and phagocytosis, lysins and complement fixation tests, vaccines, and finally anaphylaxis. Each of these chapters have been carefully compiled and present to the reader in a very understandable and interesting form the salient features of the subject under discussion. A glossary of terms used in immunological study is appended.

As the author has intended, the book will be of much value to students who in their course require a superficial knowledge of immunology; to the nurse in training, however, as their course in most institutions is given at the present time, this book is too comprehensive as a text but would serve admirably as a nurses' reference book in immunology. To the busy general practitioner who desires a small volume which quickly places before him a clean cut picture of the problems of immunity, this small handbook can be well recommended. F. W. LUNEY

Books Received

Transactions of the American Surgical Association—40th volume. Edited by John H. Jopson, M.D. For sale by William J. Dornan, Philadelphia.

Standard Methods for the Examination of Water and Sewage—fifth edition. Published by American Public Health Association, New York City, 1923.

Standard Methods of Milk Analysis—of the American Public Health Association and the Association of Official Agricultural Chemists. Fourth edition. Price, 40 cents. Published by the American Public Health Association, New York City, 1923.

Applied Psychology for Nurses By Donald A. Laird. 229 pages, illustrated. Price, \$2.50. Published by J. B. Lippincott Company, 201 Unity Building, Montreal, 1923.

Outline of Ultra-Violet Therapy Second edition. By A. J. Pacini, M.D. 204 pages, illustrated. Published by Poole Bros., Chicago, 1923.

Cyanosis Volume II. By Christen Lundsgaard and Donald D. VanSlyke. 71 pages, illustrated. Published by Williams & Wilkins Company, Baltimore, Maryland, U.S.A., 1923. Price, \$2.00.

Legal Medicine and Toxicology Volumes I and II. By Frederick Peterson, M.D., Walter S. Haines, M.D., and Ralph W. Webster, M.D. Two octavo volumes, totalling 2,268 pages, with 334 illustrations, including 10 insets in colours. Price, cloth, \$20.00 net. Published by W. B. Saunders Company, Philadelphia and London. Canadian Agents—The J. F. Hartz Co., Ltd.

The Electrocoagulation Method of Treating Diseased Tonsils.—Frank J. Novak, Jr., Chicago, employed this method in 100 cases. Without exception, the patients had a stormy experience beginning a few hours after operation. Pain was uncontrollable save by liberal doses of morphin. There was extreme difficulty in swallowing, much greater than after tonsillectomy. The plate was extremely edematous, and speech was impossible. The

intensity of this reaction persisted through the sixth day. Whatever logical basis electrocoagulation of diseased tonsils may have, from a theoretical standpoint, is far outshadowed by the unsatisfactory results in actual practice. Novak believes that the method is entirely inadequate, inaccurate and unsatisfactory, and cannot in any manner compete with the accepted present-day methods of tonsillectomy.—*Journal A. M. A.*, June 23, 1923.



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